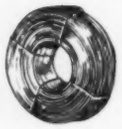
don't hang it...

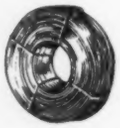
SPIN IT!

with

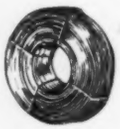
NEALE CABLE SPINNING WIRE



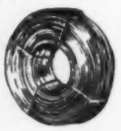
No. 10-A. Type 316, .061 diameter, stainless steel spinning wire. Has highest corrosion resistance under all conditions. Used with steel strand. 650 feet per coil; 6 coils per carton.



No. 7-A. Aluminum alloy, .091 diameter. Very high corrosion resistance, but not recommended for installations subject to salt spray condition. Used with steel strand. 325 feet per coil; 6 coils per carton.



No. 4-A. Special soft, .091 diameter Copperweld spinning wire, recommended for use in areas subject to corrosive fumes or atmosphere. Use only with Copperweld strand. 325 feet per coil; 6 coils per carton.



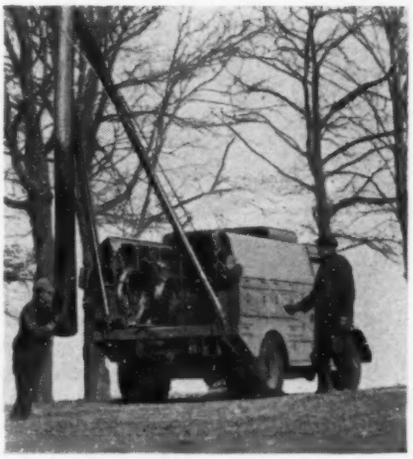
No. 1-A. Special soft, .091 diameter heavy galvanized, "C" coating annealed spinning wire. For use with steel strand where corrosion conditions are normal. 325 feet per coil; 6 coils per carton.

ORDER CABLE SPINNING WIRE FROM

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET · CHICAGO 7, ILLINOIS

FWD TRUCKS DO MORE WORK FOR MINNESOTA UTILITY



This FWD Model HAU, equipped with winch, derrick, crew-type cab with periscopic rear vision mirror and 110-volt generator, is helping to reduce construction backlogs, while also handling maintenance work in five southern Minnesota counties, where the terrain is hilly and swampy, and the truck must operate "off the road" much of the time. FWD four-wheel drive power and traction and complete "work-shop facilities" are needed on this work. Photo below: Setting poles is easy and fast with FWD winch and derrick.

FWD four-wheel-drive utility trucks can be depended upon to get through to location wherever the job has to be done in line construction, maintenance or emergency work, on or off the highway.

Distributed by GraybaR

For further information, see GraybaR, *or write . . . .*

THE FOUR WHEEL DRIVE AUTO COMPANY, Clintonville, Wisconsin

Canadian Factory: Kitchener, Ontario

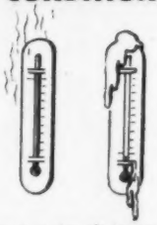
WORLD-WIDE SALES and SERVICE

FWD

America's Foremost Heavy-Duty Truck

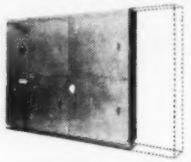
WILL YOUR

DEPENDABLE UNDER ALL CONDITIONS



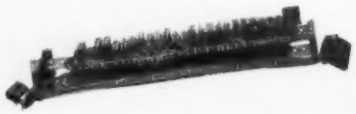
In sub-zero or tropic temperatures, Kellogg engineering insures trouble-free Relaymatic operation

COMPACT— SAVES SPACE



Relaymatic compactness cuts building or remodeling costs

SIMPLIFIED WIRING

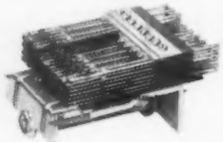


Link assembly units, factory wired and tested, make expansion easy

TWIN CONTACTS OF PRECIOUS METAL

Extra dependability, less need for service attention

RELAY OPERATION THROUGHOUT



No ratchets, cams or gear to wear or cause trouble

Before you invest in a dial switchboard, ask yourself these questions: Why are so many Independent telephone companies choosing Relaymatic? Why are so many sold on the ability of the Relaymatic to increase earnings, improve service and reduce maintenance costs.

You'll find the answer in the five points listed above. Here is the combination of features that will pay you highest dividends on your investment. Have ALL these features in your next switchboard. Ask your Kellogg representative to give you full details next time he calls. Or write us today.

1897 KELLOGG 1947

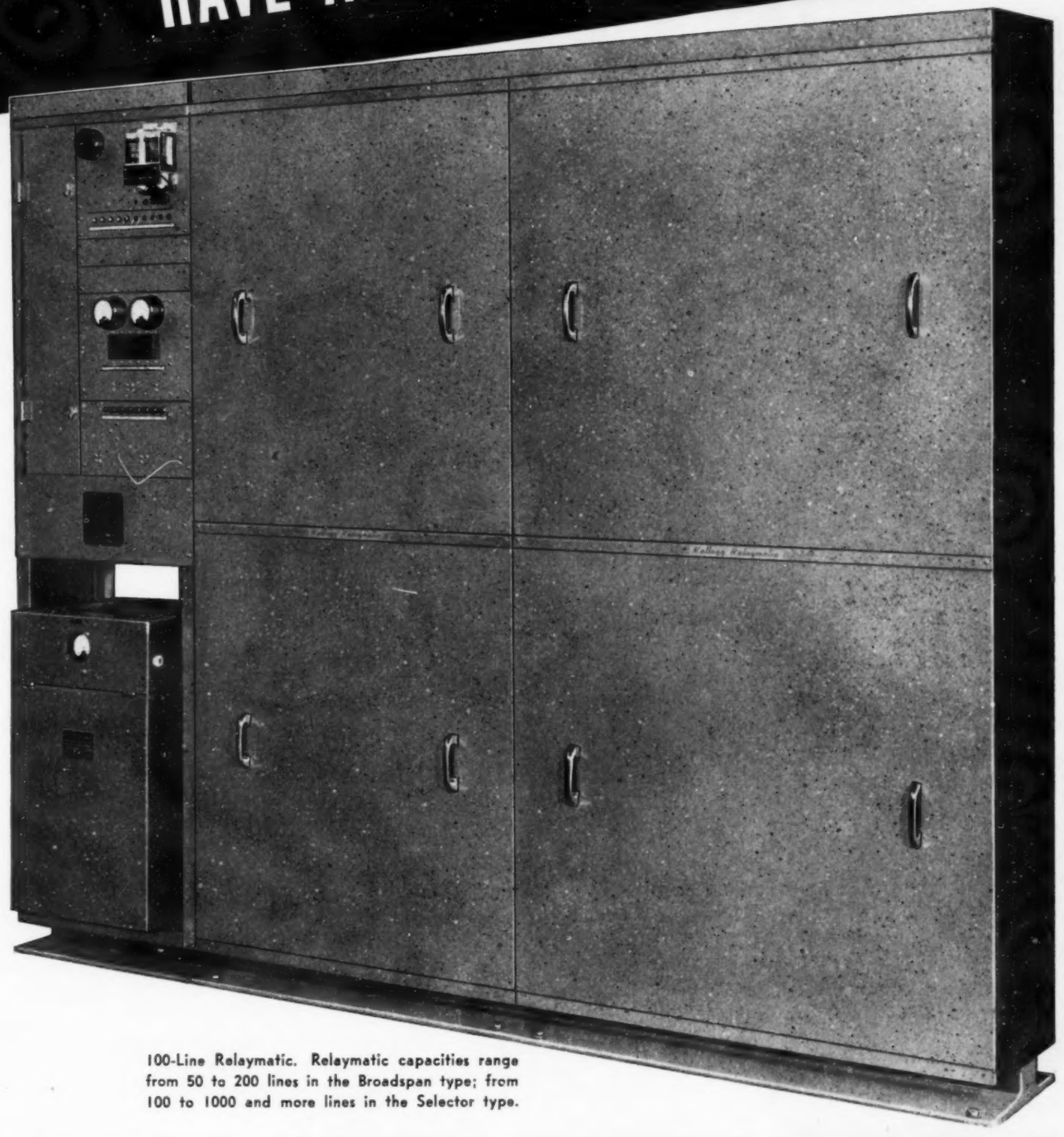
Semi CENTENNIAL Fifty Years OF SERVICE AND PROGRESS

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

KELLOGG SWITCHBOARD & SUPPLY COMPANY

6650 SOUTH CICERO AVENUE • CHICAGO 38, ILLINOIS

NEW SWITCHBOARD HAVE ALL THIS?



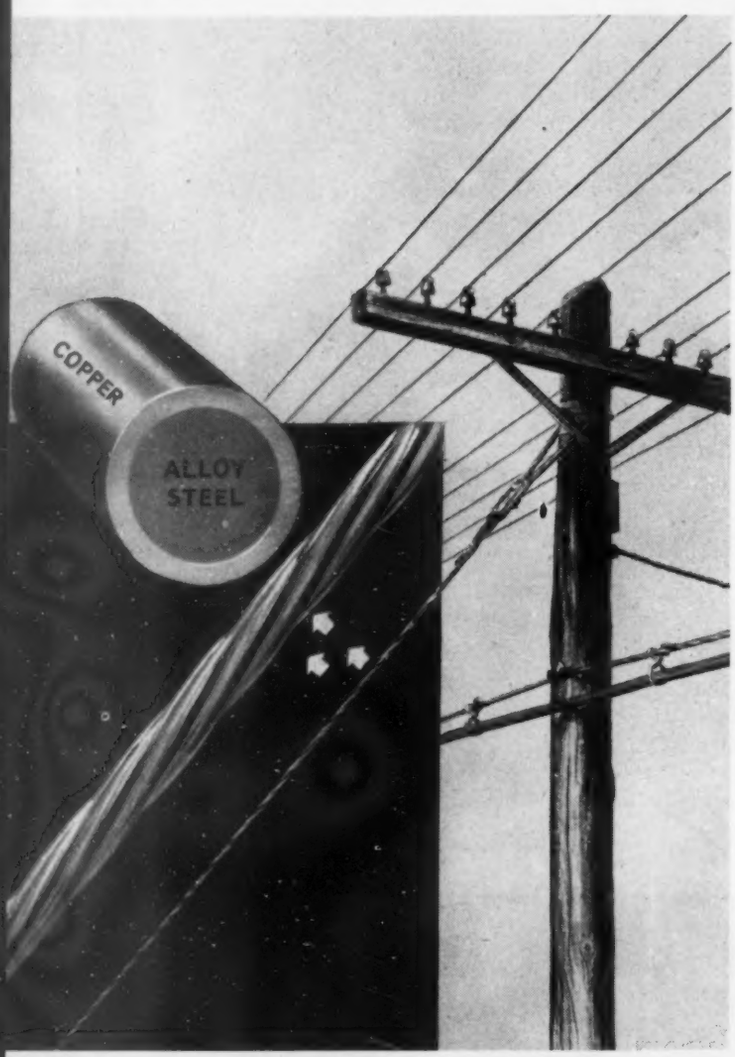
100-Line Relaymatic. Relaymatic capacities range from 50 to 200 lines in the Broadspan type; from 100 to 1000 and more lines in the Selector type.

KELLOGG *Simplified* RELAYMATIC

THE DIAL SWITCHING UNIT BUILT FOR LASTING SATISFACTIO

The Satisfaction Lasts
When You Buy Products

Recommended and Guaranteed by **KELLOGG**

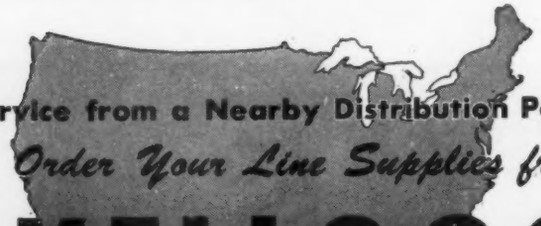


Strength Plus Life. Select guy and messenger strand on the basis of breaking strength and life, and you'll choose Copperweld. No need to buy oversize strand as a protection against loss of strength due to rust—each wire of Copperweld has a thick covering of copper *permanently* molten-welded to an alloy steel core. Made by COPPERWELD STEEL CO.

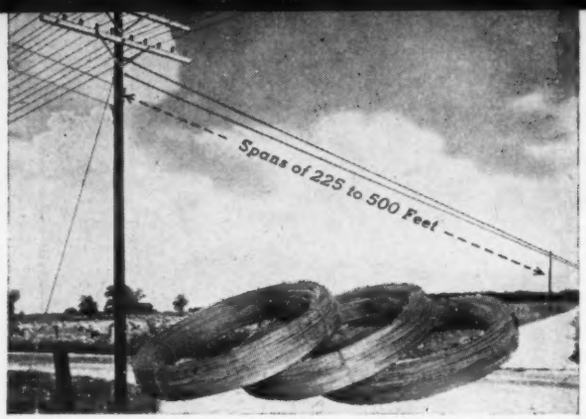
Sealed Against Trouble. Leading manufacturers of communication equipment rely on Kester Rosin-Core Solder to eliminate high-resistance joints and intermittent open-and-closed circuits. It permanently seals joints, protects them against service troubles. The special flux in this KESTER SOLDER CO. products will not cause corrosion.

There's three-way satisfaction when you concentrate purchases of line supply and constuction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

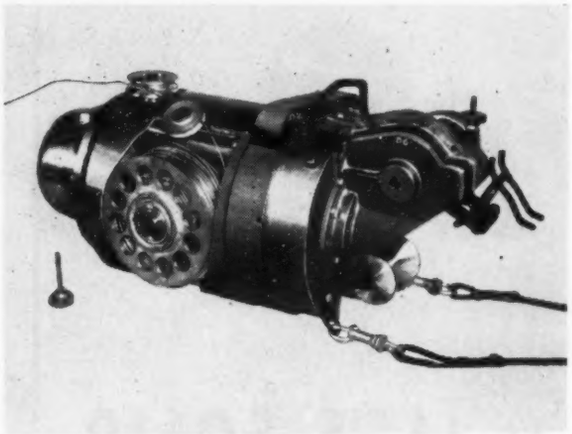
KELLOGG SWITCHBOARD & SUPPLY COMPANY
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38



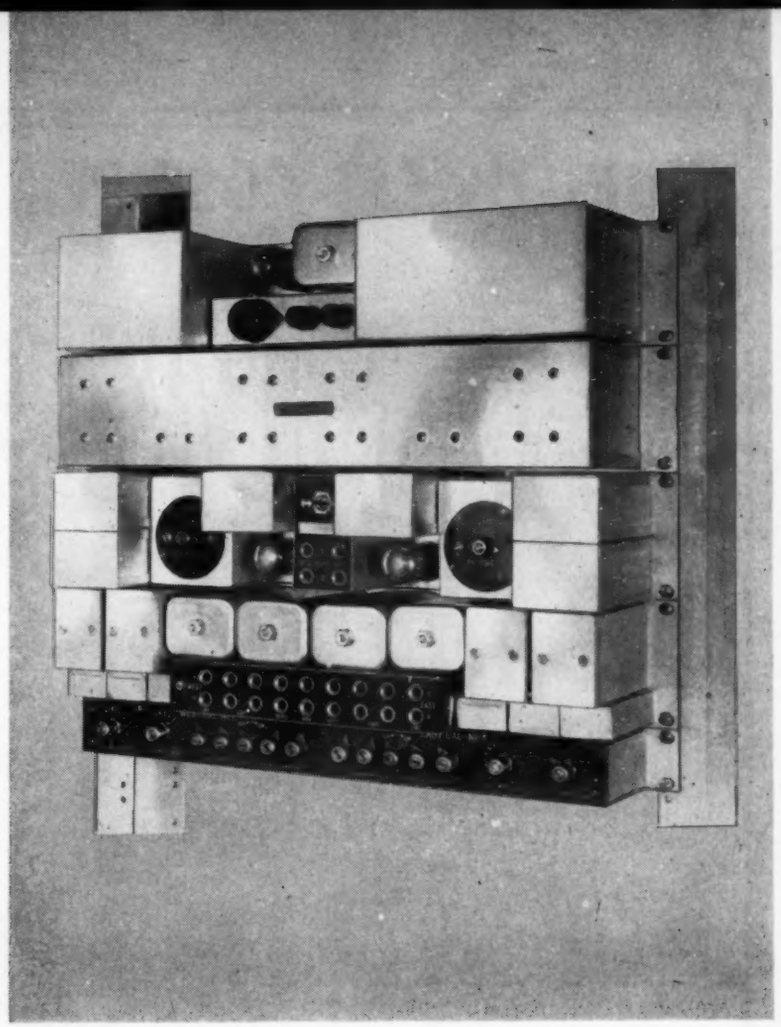
For Service from a Nearby Distribution Point
Order Your Line Supplies from
KELLOGG



Save Three Ways . . . on materials, man-hours and maintenance, with INDIANA STEEL & WIRE COMPANY'S Crapo HTL-85 and Crapo HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing process, it's protected with a heavy, ductile, tightly-adherent coating of zinc.



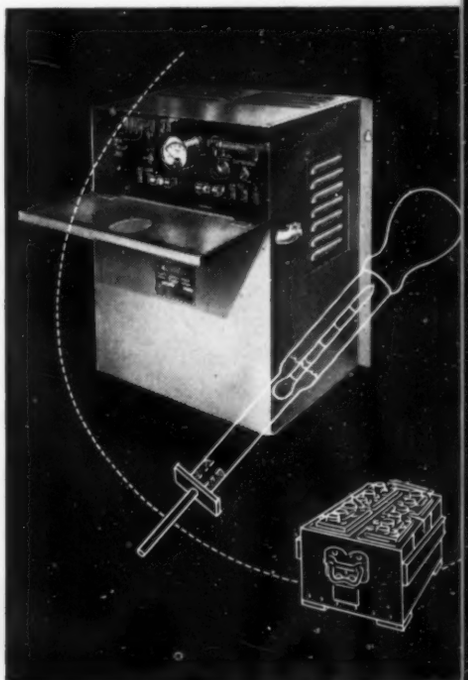
Lower Costs On New Construction! The new Model "D" Neale Cable Spinner is a pull-type spinner built to withstand rugged operating conditions. This CABLE SPINNING EQUIPMENT CO. product is equipped with a double-drive mechanism, ratchet lock and detachable ring pusher.



For adaptability to varied applications, all five units of the Kellogg Voice Frequency Telephone Repeater—repeater, filter, balancing network, power and line units—are assembled and wired on a unit basis. Kellogg Voice Repeaters may be used as intermediate repeaters, cord circuit repeaters or line terminal repeaters. Balance and gain adjustment simple. Built to KELLOGG high standards.

Dependable—In Any Weather! Hemingray Insulators are made to withstand severest weather. They defy rain, snow and sleet. Products of OWENS-ILLINOIS GLASS CO., many of these insulators are still serving after 20, 30 and even 50 years. Shown is Hemingray No. 9.

Reduce Post-War Operating Cost with GOULD Flotè Telephone Batteries. The experience of many telephone engineers proves that the famous Flotè element eliminates low cells in full float service, lowers maintenance and charging costs, and materially lengthens battery life. Ask today for full data.



Never Over, Never Under. The RectiChargeR automatic method of charging keeps batteries fully charged always, and ends trouble caused by under-or-over charging. That's why this unit, made by RAYTHEON MFG. COMPANY, is so popular with telephone men everywhere.

FOR LOWEST COST PER YEAR

GENCATEL

DROP WIRE

IT'S SOLID

Gencatel drop wire is fortified with a heavy molded jacket of Polyethylene — *solid all the way through.*

Polyethylene-jacketed Gencatel is fortified against heat, cold, rain and sleet to give you the lowest drop wire cost per year. It's fortified, too, against practically every known type of abuse. Polyethylene is the toughest insulating material that has ever been developed. You'll save money when you install Gencatel, because Gencatel will stay up years after other drop wires have outlived their usefulness. Available with 17-gauge conductors—either parallel or twisted pair. Specify Gencatel the next time you order drop wire.

RECOMMENDED AND DISTRIBUTED BY

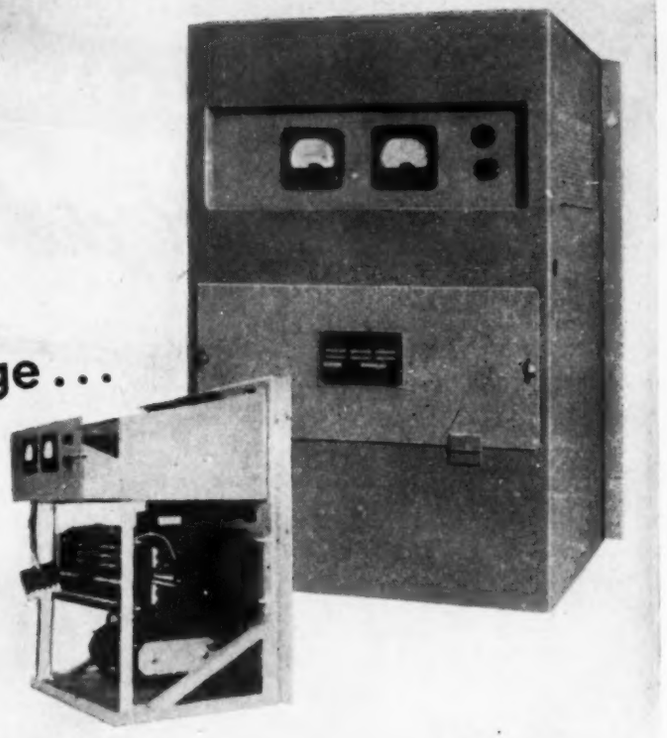
AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET · CHICAGO 7, ILLINOIS

Greater Flexibility . . .

Greater Frequency Range . . .

Closer Regulation . . .



with the NEW RAYTHEON ELECTRONIC RECTICHARGER

CAT. NO.	2013 A	2013 B	2016 A	2016 B
INPUT	1ph. 115/230V 50/60cy.	1ph. 115/230V 50/60cy.	1ph. 115/230V 50/60cy.	1ph. 115/230V 50/60cy.
DC VOLTS OUTPUT	24	48	24	48
CELLS	11/12	22/24	11/12	22/24
DC AMPS. OUTPUT	12	6	24	12
LENGTH	20⅞	20⅞	27⅞	27⅞
WIDTH	16 29/32	16 29/32	16 29/32	16 29/32
HEIGHT	15 3/16	15 3/16	15 3/16	15 3/16

To the high-power end of the well-known Raytheon RectiChargeR line has now been added this new electronic model . . . available in capacities up to 24 amp. at 24 volts, or 12 amp. at 48 volts.

Compactness has been achieved by use of an electronic amplifier in conjunction with a saturable core reactor. This unit provides greater flexibility of adjustment, greater frequency range, and closer tolerance of regulation.

Long-life dry plate rectifiers, sturdy magnetic components and well-ventilated case make the Raytheon *Electronic* RectiChargeR a thoroughly effective and reliable telephone power supply.

For details, write for Bulletin DL-RCR-506.

Note the range of capacities in which the Raytheon RectiChargeR is made. Your regular supplier of telephone equipment will be glad to help you select the proper power supply for your application.

RAYTHEON

Excellence in Electronics

RAYTHEON MANUFACTURING COMPANY

COMMERCIAL PRODUCTS DIVISION

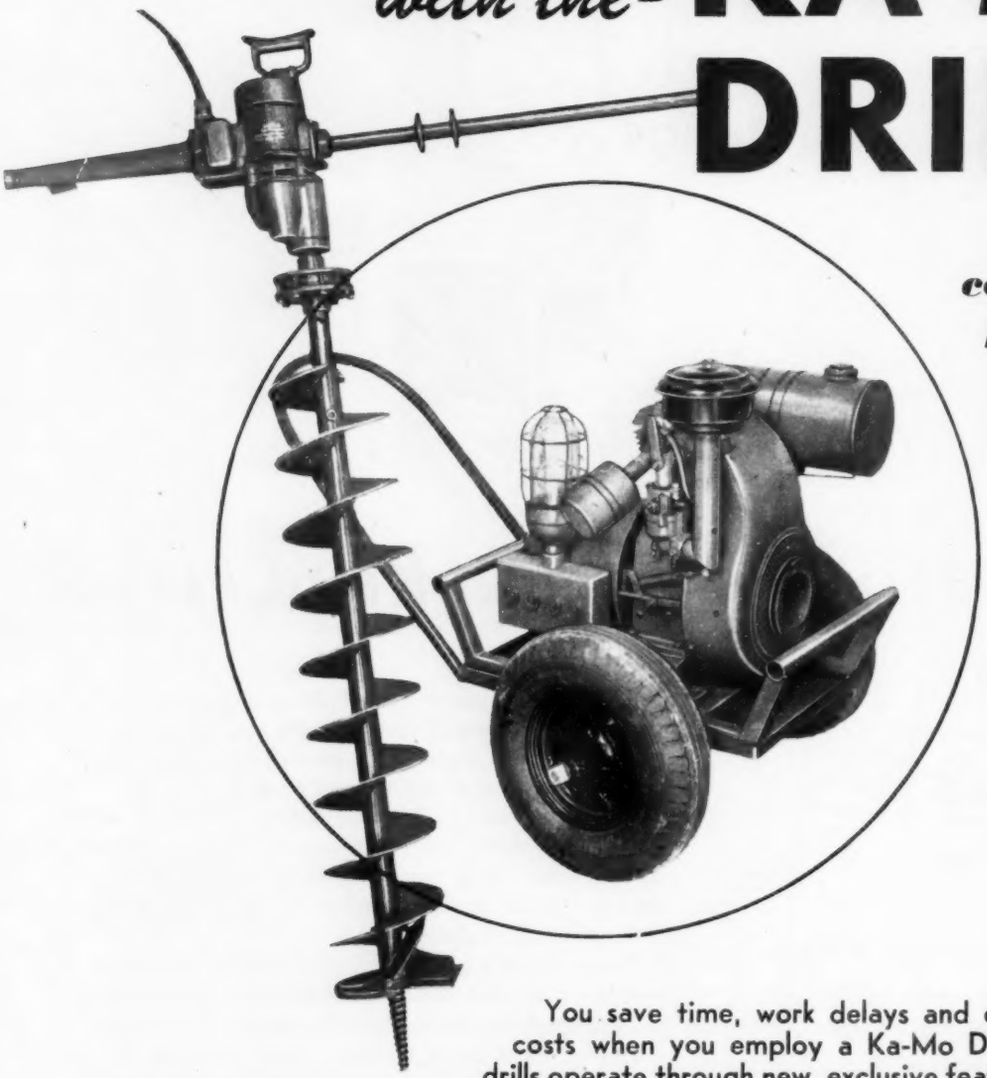
WALTHAM 54, MASSACHUSETTS

Industrial and Commercial Electronic Equipment, Broadcast Equipment, Tubes and Accessories

Sales Offices: Atlanta, Boston, Chicago, Cleveland New York

cut construction cost...

with the- KA-MO DRILL



complete 6-foot holes in one to three minutes of actual drilling time.

You save time, work delays and construction costs when you employ a Ka-Mo Drill. Ka-Mo drills operate through new, exclusive features. Unlike old-style augers, Ka-Mo drills plane the earth. They cannot choke or bury themselves. Complete 6-foot holes are drilled in one to three minutes of actual drilling time. Ka-Mo drills operate economically with 2½ KW AC or 3 KW DC portable generators. Patented safety clutch makes drilling easier, disengages to permit new bite when rocks or snags are encountered.

Modernize your line construction methods now with the Ka-Mo drill. Ask for complete information.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET, CHICAGO 7, ILL.

PROLONGED LIFE

for your New or Worn Cables

Reliable

ZINC
CABLE HANGERS

because—

- ✓ Cable is bonded solidly to strand.

therefore—

- ✓ All Cable movement is eliminated.
- ✓ No possibility of wear or sheath cutting.
- ✓ Added protection against lightning.

- **They are strong, economical and easy to install.**
- **They are trouble-free for the life of the cable.**
- **They are available for galvanized strand—also available in copper for use with copperweld.**

BUILD FOR THE FUTURE—

Specify Reliable!

Reliable

ELECTRIC COMPANY

3145 CARROLL AVENUE **CHICAGO 12, ILLINOIS**

OVER 40 YEARS *Service* TO THE TELEPHONE INDUSTRY

SERVICE THAT NEVER SLEEPS

Most Americans take around-the-clock telephone service for granted.

This basic difference between telephone service and most other kinds of service is the theme of the advertisement on the opposite page. It is appearing in national magazines during the month of December.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

IN THE DARK SILENCE OF THE NIGHT

Bell Telephone service isn't a 9 to 5 service. It is one of the few services in the world that are always available to the public . . . twenty-four hours a day, Sundays and holidays.

In the dark silence of the night there is one light forever burning—one voice that is never stilled.

That light is the light of the Bell Telephone Exchange. That voice is the voice of your telephone. Its very presence brings a feeling of security, whatever the need or the hour.

Service in some countries shuts down with the end of the day. Bell System service keeps on going the whole twenty-four hours of the day and night, Sundays and holidays.

It costs us more that way but we know that is the way you'd like to have it.

BELL TELEPHONE SYSTEM

Take Advantage of Mutual's Liquid Gas Field Equipment

- *Put Coveralls on Maintenance Dollars*

- No Moving Parts to Repair
- No Priming, Pumping or Generating
- No Coils to carbon-up
- No smoke or Odor
- Safety of Modern Fuel
- Maintenance Dollars reduced to a few cents.

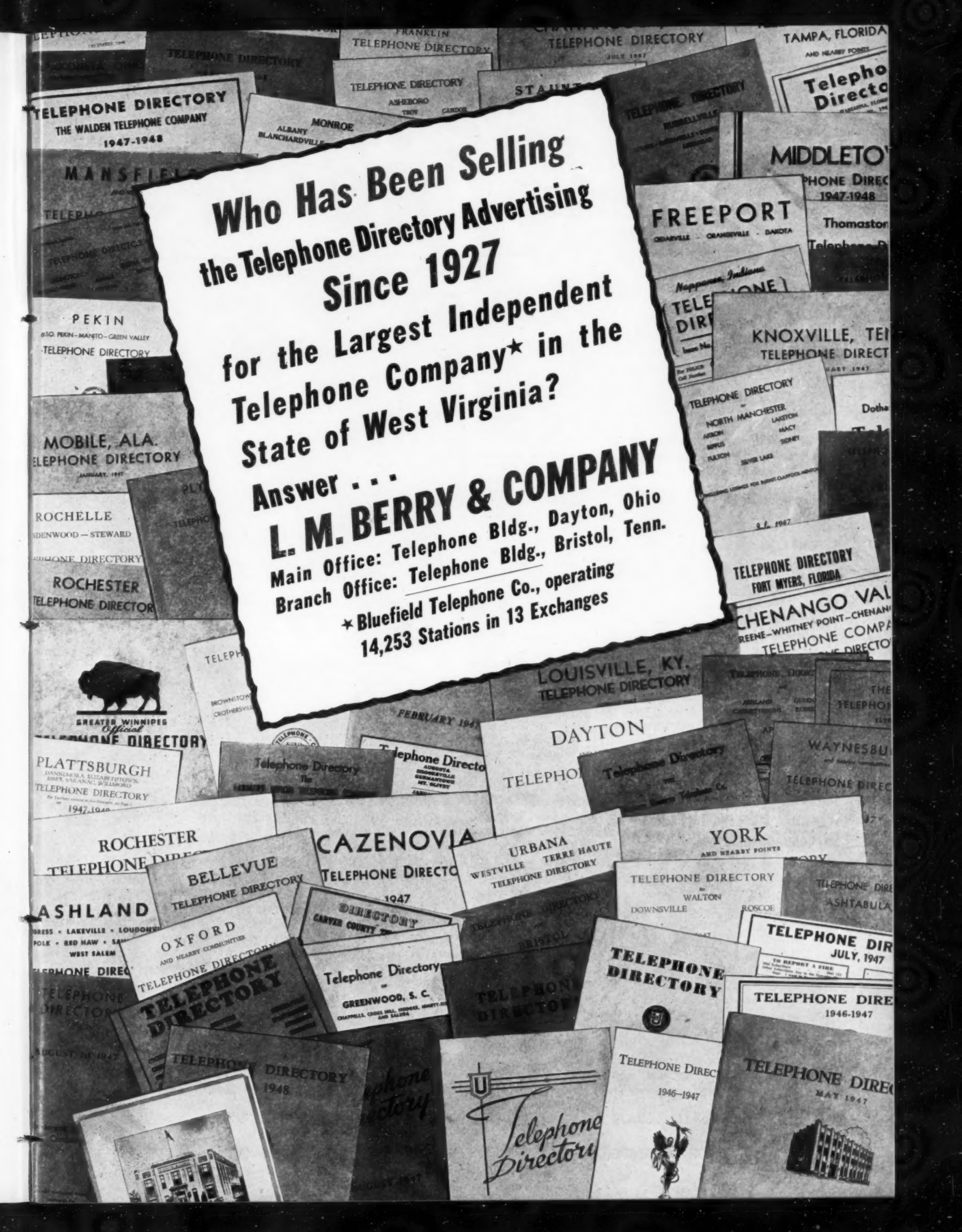
Above are listed a few of the reasons why MUTUAL Liquid Gas Lead Melting Furnaces and Heating Torches are superior to makes which use slow, inefficient fuels. Liquid Gas vapors are drawn off from the liquid within the container by simply opening the valve. After lighting the vapor, place your six or eight inch lead pot on the furnace and within ten minutes 60 pounds of lead is melted (Using our No. 2 Furnace). Liquid Gas Fuels (Propane and Butane) are about half the weight of gasoline or kerosene. Flames can be adjusted from a blast (2300° F.) to candle flame.

It's Easier . . . Safer . . . Faster . . . More Economical

"ASK THE MAN USING MUTUAL LIQUID GAS FURNACES AND TORCHES"

Contact Your Nearest Supply House or Write Us Direct for MUTUAL'S NEW CATALOGUE T999

Mutual **LIQUID GAS EQUIPMENT CO., Inc.**
3600 WEST IMPERIAL HIGHWAY, INGLEWOOD, CALIF.


Who Has Been Selling
the Telephone Directory Advertising
Since 1927
for the Largest Independent
Telephone Company* in the
State of West Virginia?
Answer . . .
L. M. BERRY & COMPANY
Main Office: Telephone Bldg., Dayton, Ohio
Branch Office: Telephone Bldg., Bristol, Tenn.
*Bluefield Telephone Co., operating
14,253 Stations in 13 Exchanges
TELEPHONE DIRECTORY
THE WALDEN TELEPHONE COMPANY
1947-1948
TELEPHONE DIRECTORY
ASHEBORO
TELEPHONE DIRECTORY
FRANKLIN
TELEPHONE DIRECTORY
TELEPHONE DIRECTORY
JULY 1947
TAMPA, FLORIDA
AND NEARBY POINTS
MONROE
ALBANY
BLANCHARDVILLE
MANSFIELD
MIDDLETOWN
1947-1948
FREEPORT
CRANVILLE - GRANVILLE - DAKOTA
Thomaston
Napanee, Indiana
PEKIN
TELEPHONE DIRECTORY
KNOXVILLE, TEN
TELEPHONE DIRECTORY
MOBILE, ALA.
TELEPHONE DIRECTORY
JANUARY, 1947
TELEPHONE DIRECTORY
NORTH MANCHESTER
ARGOS
BURRIS
FULTON
LARTON
NACY
SIDNEY
SILVER LAKE
ROCHELLE
ROCHESTER
TELEPHONE DIRECTORY
TELEPHONE DIRECTORY
FORT MYERS, FLORIDA
CHENANGO VAL
GREENE-WHITNEY POINT-CHENANGO
TELEPHONE COMPA
GREATER WINNIPEG
Official
TELEPHONE DIRECTORY
LOUISVILLE, KY.
TELEPHONE DIRECTORY
FEBRUARY 194
DAYTON
TELEPHONE DIRECTORY
PLATTSBURGH
TELEPHONE DIRECTORY
1947-1948
Telephone Directory
Telephone Directory
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TELEPHONE DIRECTORY
ROCHESTER
TELEPHONE DIRECTORY
CAZENOVIA
TELEPHONE DIRECTORY
1947
URBANA
WESTVILLE TERRE HAUTE
TELEPHONE DIRECTORY
YORK
AND NEARBY POINTS
BELLEVUE
TELEPHONE DIRECTORY
ASHLAND
TELEPHONE DIRECTORY
WALTON
DOWNSVILLE
ROSCOE
ASHTABULA
OXFORD
AND NEARBY COMMUNITIES
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TELEPHONE DIRECTORY
JULY, 1947
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1946-1947
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1948
Telephone Directory
TELEPHONE DIRECTORY
1946-1947
TELEPHONE DIRECTORY
MAY 1947

NEWS BRIEFS

La Crosse (Wis.) Company Plans Mobile Service

The La Crosse (Wis.) Telephone Company is embarking on a program which will enable the general public to install radio-telephones in their cars and talk with any point in the United States or any other automobile which is equipped for the same purpose

No definite date has been set for installation in the La Crosse area. The costs of putting the system into effect was estimated at 60 to 70 thousand dollars.

The company plans to put in a 250-watt fixed FM transmitter to operate in the 30.3 to 44-megacycle band which was allocated by the FCC to highway mobile radio-telephone service. While the installation will be designed to fit into any highway network system which may be inaugurated in the future by the American Telephone & Telegraph Company, it also will be utilized to provide urban radio-telephone service to La Crosse subscribers. The range of the proposed transmitter is estimated at 30-40 miles.

A fixed receiver also will be put in and both the transmitter and receiver will be connected by physical means to control equipment in the telephone building. One position of the toll switchboard will be equipped for mobile service.

◆

Wisconsin Independent Honors Six Veteran Employees

At a district meeting in Whitehall, Wisconsin the Community Telephone Company of Wisconsin recently gave special recognition to six employees who have been with the company 20 years or more. The employees honored were; Miss Ethel Mallery, Whitehall, whose record is over 40 years; Mrs. Cora Arneson, Whitehall, who has served as operator over 28 years; Mrs. Clara Enger, Ettrick, over 30 years; Mrs. Mayme Kells, Galesville, and Miss Florence Hess, Arcadia, over 24 years of service, and Oscar Severson, Galesville, maintenance man, who has been with the company over 21 years.

Manager B. H. Piepmeier, of Black River Falls, spent some time explaining to all employees the problems confronting the company at this time in securing telephone materials and supplies and the financing of its work. He showed how the cost of providing telephone service had increased by leaps and bounds during the past few years and how expenses were exceeding the company's income. An increase in telephone rates was the only answer, he said, to provide more and better telephone service, higher wages for employees, and a fair return or wage for money invested.

Mr. Piepmeier compared present prices with those that existed in 1940 and showed that it took approximately three bushels of wheat or 4½ bushels of corn to pay for the average monthly telephone bill in 1940, while today one bushel of corn exceeds in value the average monthly telephone bill. According to Capper's Farmer, the average income per farm in Wisconsin during 1934 was $1,215 while in 1946 it was $4,956 or an increase of 307 per cent, he said.

Florida Telephone Association officers (left to right): Al Mooneyhan, dist. mgr., Southern Bell (not an officer); J. K. Galloway, president; Josephine Poppleton, secretary-treasurer, and P. M. Schuchart, second vice pres. E. L. Cox, first vice pres., was absent.

◆

REA Cooperative Uses Radio Communication

Installation of a two-day frequency modulation radio communication system recently was completed by the Tri-County Electric Cooperation of Rushford, Minn.

The installation consists of a land station at Rushford and mobile units in the cooperative's six maintenance trucks. According to G. J. Werner, president, use of the system will aid greatly in reducing time necessary to repair lines and return them to service in the event of a line failure.. It also provides a means of communication between trucks and between maintenance trucks and the REA office at Rushford.

◆

Six Retiring Employes Of Lincoln T. & T. Honored

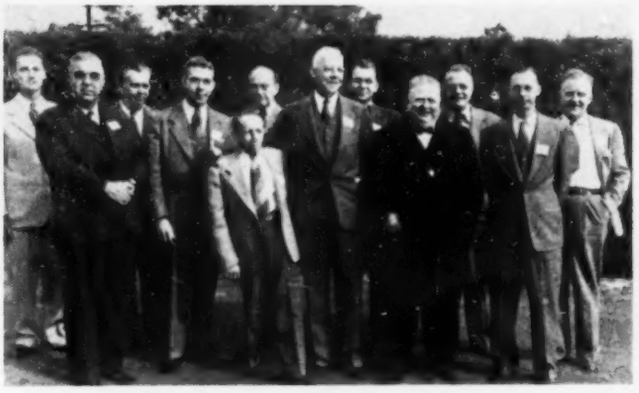
Six retiring employes of the Lincoln (Neb.) Telephone & Telegraph Company were recently honored at a dinner given by the company's board of directors.

Service of the honored employes averaged slightly more than 32 years. Thomas C. Woods, president of the company, presented the guests. John Agee, vice president and general manager, was master of ceremonies. Thirty-two officers, supervisors and directors of the company attended.

Those honored were: William E. Macdonald, Beatrice; Henry E. Apking, Hebron; Emma L. Bradley, Douglas; William E. Cummings, Hastings; Ted S. Burr, Hastings and William L. Eckles, Nelson.

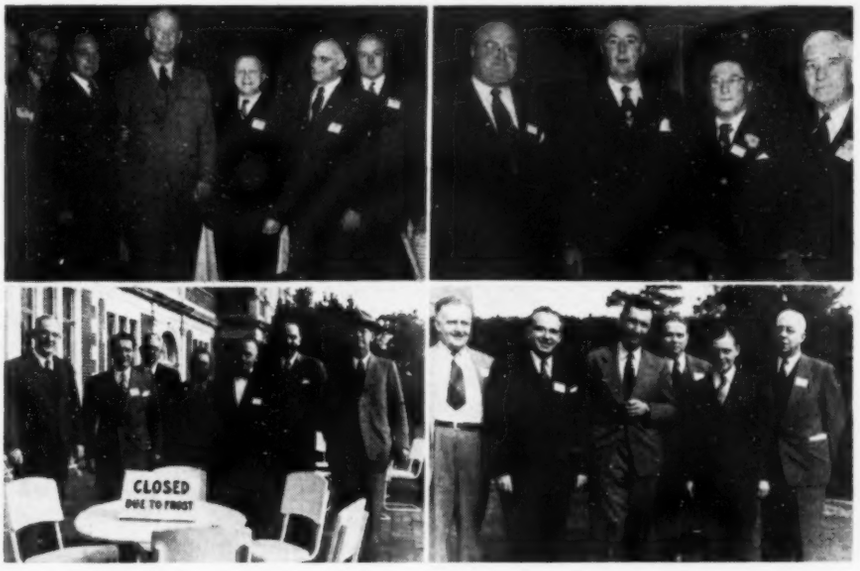
TELE-VIEWS

W. E. Olschner, retiring president of North Carolina association, W. N. Angle, Stromberg-Carlson's board chairman, and Mrs. Olschner, during hospitality hour at recent North Carolina convention.

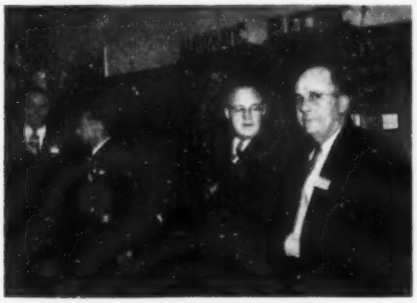


Group photo of officers and directors of North Carolina Telephone Association.

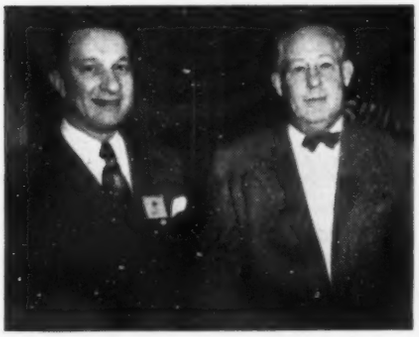
Missouri Assoc. President Boutin presents government bond to Miss Catharine Bauer, secretary to Colonel Bob Hedrick, and secretary to the Theodore Gary Chapter of the Independent Telephone Pioneers, for her years of faithful service.



Group photos taken by T E & M camera during Missouri and North Carolina conventions. Upper left, North Carolina; upper right, Missouri; lower photos, North Carolina.



Between sessions of Missouri convention Automatic's Les Gaddis and Missouri president-elect F. M. Browne, pause to discuss convention activities.



Photographed during recent North Carolina convention: Stromberg-Carlson's "Moon" Mullins and Kelley McNish.

Part of the directors and officers of the Missouri Telephone Association; photographed during recent convention.

Above:—Business office of Southeast Missouri Telephone Co., Cape Girardeau. Left:—Accounting office of Gulf States Telephone Co., Tyler, Texas.

MANAGEMENT--PRESENT and FUTURE

By

RAY W. SMITH

Editor,
TELEPHONE ENGINEER Publications

IN ADDRESS delivered at state telephone convention in Wisconsin, Oregon, South Dakota, Michigan and Missouri, Editor Smith urged company managers to recognize—good plant, good service and good rates—as recipe for prosperous operations.

IN A RECENT editorial we reminded our readers of an old saying to the effect that *if you are not in business for the purpose of making a profit, then you are not really in business at all*—you are running a philanthropic institution.

There are literally thousands of small businesses in the United States, all the time, that never make an actual profit. The best that a great many of them ever do is to provide a living, and frequently not a very good living, for whoever runs them. Many of them do not even do that, which accounts for the high annual mortality of small businesses. The manager or owner lives off of the capital of the business for a time, but that cannot go on forever, so in due course the business goes broke. It either folds up and ceases to exist, or somebody buys it at a distress price and tries his hand at making a profit out of it.

This is what happens to many businesses such as small stores, meat markets, service stations and the like. The net result is that the owner has lived up or has given away—by operating at a loss—all or a substantial part of his capital. This is the equivalent to what might be called *confiscation of the* lost capital by the customers, *but with the cooperation of the loser.*

This need not happen to a small telephone business, if it is sufficiently large to be an economic unit at all. There is an important reason for that. The reason is that the same laws and system of regulation which regulate the small telephone company as a public utility, can be used to prevent the confiscation of the company's property by the public.

Proper Management Protects Investment

THERE IS one limit upon telephone rates beyond which the court of the land will not allow regulatory commissions to go—that is the point where confiscation of the company's property would begin. That fact, coupled with proper management of the small telephone company, protects it against the eating up of its assets and property by the public.

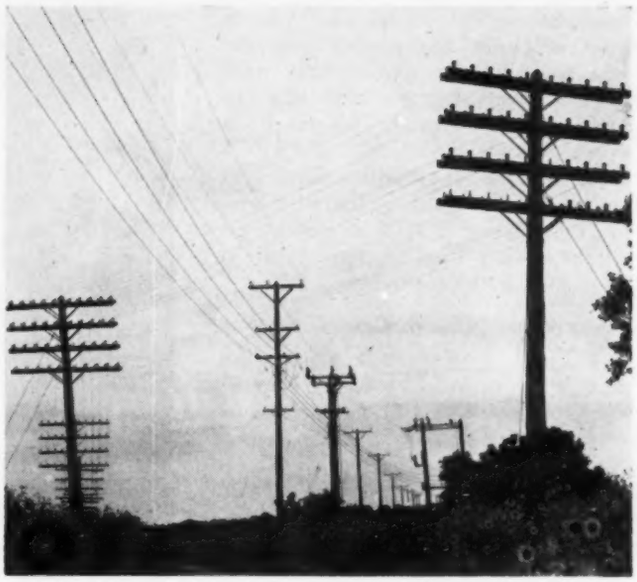
The small telephone business has, therefore, a great advantage over other small businesses. It has, in most cases, a monopoly in its territory, and the commission regulating it cannot force it to charge rates so low that its property would be confiscated.

The recipe we have often propounded for making the small telephone company prosperous and profitable involves—good plant, good service, and good rates. With that combination any telephone company which is not so small that no rate schedule, however high, would make it profitable, should be able to make a profit.

If a telephone company is not earning enough money to pay all of its expenses, including a proper salary for the manager if he is the

owner, and to set aside from earnings enough for depreciation to cover the loss of property used up in rendering the service, and have something left over as income on its investment, then it is not making a profit—and can be put in the class of a philanthropic institution. And that, in our opinion, is not the class it should be in.

Now I am not one of those who has the temerity to offer a telephone management course in five easy lessons and guarantee to make a leader out of every student. There are no 10 commandments for making any business run profitably. No two telephone men will do the job alike. The best I hope to do is to point out broad management principles that I have observed doing the job for both large and small Independent operators.



"Independent companies to remain prosperous require Good Plants, that are capable of providing Good Service . . ."

Successful Companies vs. Successful Men

SUCCESSFUL telephone companies are similar to successful men. The first quality I have observed in business leaders is *an ability to see the completed thing whole before a start is made.*

Some men have a natural ability and others have trained themselves to think ahead and see a project complete in all its details before they start on it. Some start building a house by first laying the foundation, then deciding on brick or stone, or wood and then figuring the number of rooms. In some cases after the second story is finished—the question of where the staircase will go comes up. Others see the building complete even to the lighting fixtures and the rugs on the floor.

Remember how you appreciate the assistant who tells you that "this should be done"—because next January it will mean so and so ? ? . . . Yes, when a man can see far down the road, he speeds up! Incidentally nearly all obstacles shrink to trifles when reviewed down the smooth stretch of a five year program!

Trailing a close second to ability to look ahead comes *organization!* The industry leaders have the ability to build an organization—to man it—equip it with man power—get the right man for the right place. Then the next quality of *leadership* steps in.

To summarize the qualities of leadership in a few words, they are: (1) The ability to visualize; (2) to organize, (3) to deputize, and (4) to supervise.

Whenever you find good telephone management—you find those four qualities in the men at the helm of the company. And such men realize the fact that an Independent company to remain prosperous needs *Good Plants—Good Service—and Good Rates!*

Those points have been hammered at for years; Good Plants—Good Service—Good Rates are the secret to good dividends, and many telephone plants with good plants, good service and compensatory rates are producing results! Doing well despite modern day troubles!

Good Management has aided these go-ahead companies! They've obtained financing on terms they could afford. Rehabilitation—including new central offices and subscriber's equipment—has been made or scheduled. They have prepared and prosecuted rate cases to establish compensatory rates based on their higher investment, increased costs of operation and their improved service.

Small Company Financing

NOT LONG AGO we received a letter from a small Independent. He wanted to modernize—improve his service and stay in business giving his subscribers the sparkling brand of service they wanted. He said:

> *"When I try to borrow* $10,000 *to* 15,000 *to fix up my plant, money is neither cheap or plentiful. If I find someone who will loan it to me, he wants it back in ten years or less—and I can't pay it back that quickly if I put it into a telephone plant." "What's the answer?"*

Right there we have a management who is looking ahead but is thwarted through a defect in the American economic system—the gulf between the ability of large business to finance itself and the inability of small business to do likewise!

Many of the telephone companies now receiving the attention of our State commissions are in the same position as our correspondent. Give them the money to improve facilities on terms that they can meet and give them compensatory rates—and they"ll move ahead.

Now if a business needs a considerable sum of money—say a million dollars or more, or even less in many cases—and its security and earning's position justify the loan, financial houses and insurance companies will tumble over themselves to lend the money at low interest on long terms!

But try to borrow $25,000 or less, down to a few thousand dollars for a small business, even when security and earning's position justify the loan. Then you'll be disillusioned about the cheapness and plentifulness of money for small businesses!

There appears only one way out for the companies that need additional capital that *will help them grow and keep pace with service demands.* Most small companies have to pull themselves up *by their own bootstraps*—they have to get their capital out of their earnings—if they can! And in a regulated business like the telephone industry, where earnings are relatively low—particularly in the small units—not much capital can be made available from earnings.

How a management can whip the financial problem has been theorized to death. Although I realize money alone will not cure all of today's problems, I think that telephone

associations will do all they can to help companies find proper financing facilities. The companies that want to advance, improve and stay in business are certainly deserving of every possible help.

A number of small Independent companies have taken the "bull by the horns" and gone out and raised all the money they needed—right in their own home town.

Dangers of "Boom Growth"

IN THIS connection I would like to utter a word of warning regarding improvements and the danger of disregarding *"Boom Growth"* when expanding and improving telephone plants.

Not so many days ago a manager told me, "What bothers me," explained this manager, "is the question of whether this town will support all those telephones in any but *boom times*. If it won't, then we're going to have a lot of telephone plant that we don't need, and we're going to pay interest on a considerable amount of unnecessary investment, and do that out of depleted revenues."

This manager is not alone in his predicament. From all sides come stories of an unprecedented demand for telephone service, which demands, if they are met, will require unprecedented additional investments in telephone plants.

This matter of additional investment would not be so serious if there could be assurance that it will be needed permanently. But many telephone companies, checking up on the quality of their present held orders, are finding that a large percentage of the orders now being received are of a marginal character; that is, of a type likely to fade out, as subscribers, if and as soon as employment begins to fall.

A situation of this kind is dangerous to many telephone companies. The nature of the business of supplying telephone service is such that the telephone company must make all the investment required for installing a telephone. In most cases any service connection charge hardly pays, in these days, for the labor used in installing. The telephone company makes all the investment and takes all the risk of the subscriber keeping the telephone long enough to justify the investment made.

Under the theory that a public utility company must meet all demands upon it for its services, *the public holds a blank check against the telephone companies.*

Probably no one questions the general belief that—barring a severe depression, which seems unlikely—

Ray W. Smith, editor of Telephone Engineer Publications, told convention audiences—". . . ingenuity, resourcefulness and hard work has made the Independent telephone industry the factor in telephony that it is today."

the level of telephones in service will be higher in the future than before the war. The big question is the lasting quality of a lot of installations now being demanded. The percentage of these marginal demands is becoming higher, since most companies have done all they can to take care of the more solid applicants.

During the war telephone installations were made on a selective basis. The present situation as to the demand for telephones seems to call for a procedure of commonsense selectivity, and I urge you to remember that *Boom Growth is dangerous growth in the telephone business.*

Rate Increases are Necessary

ANOTHER STEP in the "Good Plants—Good Service—Good Rates" program of the companies that are showing progress, is the "Rate" question.

Probably no one dislikes a telephone exchange rate case any more than telephone people themselves. This applies particularly to the small telephone companies, because there an increase of telephone rates is not the highly impersonal thing it is in cities. In the small town the telephone manager knows personally, and is known by, most or probably all of his subscribers. When he asks his state commission or other rate-fixing body for authority to charge higher rates for his telephone service, he realizes that he is asking many personal friends to pay him more money, and it may seem to be an unpleasant thing to do.

I doubt whether such a situation is really as unpleasant as we are likely to think it is. I think that on the contrary the average citizen has a great deal of respect for the businessman who faces the necessities of his business in a forthright manner, and who tells his customers frankly that he must *charge them more in order to be able to supply to them, in the face of rapidly mounting costs, the things or services they want.*

It is certainly no secret nowadays, to anyone, that costs have risen and are continuing to rise. Everyone who has anything to do with any kind of business knows that. The telephone company, with rates that are inadequate to meet present and prospective costs of providing the service, cover depreciation and leave the company a fair profit, has in fact only two alternatives. One is to let its plant and its service deteriorate; the other is to make effective rates that are adequate.

I think that, as to the two alternatives, it can be safely said that a great majority of telephone subscribers would prefer to pay adequate rates for telephone service than to have inferior telephone service. The principal question in the public mind about a proposed increase of rates for any utility service is that of whether or not the increase is actually justified. If the public is shown that it is justified, there is seldom any widspread objection to it.

At the July, 1947 convention of the National Association of Railroad and Utility Commissioners it was disclosed that, since the end of the war, rate increases had been granted by state utility commissions to fewer *than* 1,000 *Independent telephone exchanges—to around only* 900, *in fact.* It was also stated that, at the end of June, 1947, there were *only some* 158 *Independent exchange rate cases pending before state utility commissions.*

There are in this country, according to the statistics of the United States Independent Telephone Association, *some* 12,000 *Independent telephone exchanges.*

Even when we take into account the fact that rates have been increased at Independent exchanges in the two states in which there are no commissions with jurisdiction over telephone rates, the total number of Independent exchanges that have obtained higher rates since VJ Day is small when compared the whole number of Independent exchanges.

It should be said, in fairness to the state commissions, that the record

(*Please turn to page 66*)

WIRE Crossings OVER and UNDER Railroads

By

J. S. Reed

Fig. 7.—A six-wire overhead railroad crossing.

PRESENTATION of detail methods of constructing overhead or underground wire crossings at railroads should encourage establishment of sound construction practices with respect to wire crossings.

IT HAS LONG been recognized that telephone lines, as well as power lines, crossing over railroads are hazardous to railroad employees unless properly installed in accordance with safe practices. A low hanging wire across the tracks may easily sweep a brakeman off the top of the moving cars, or a weak improperly guyed pole may break and fall across the tracks, causing possible derailment of a passing train.

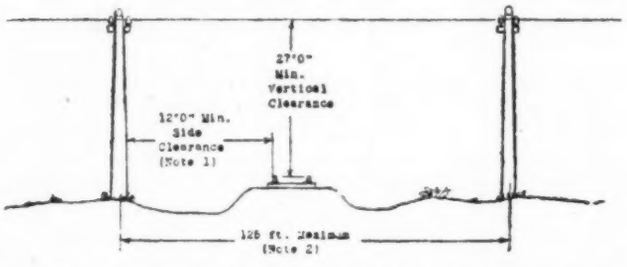
Another hazard is the breaking of wires in a crossing span. These wires may fall across railroad signal lines paralleling the tracks and cause serious accidents resulting from the interruption of the signals.

A safe, sound construction requires adequate side and vertical clearances of the poles and wires from the railroad tracks; substantial, well-supported poles at the crossing; and a reasonably short crossing span with wires of adequate strength. An alternative to these requirements that is possible under certain circumstances is to place the telephone lines under the railroad tracks.

It is the purpose of this article to discuss requirements for overhead railroad crossings and describe the method used by a large operating company to bring telephone lines under railroad tracks.

The data pertaining to the construction of overhead wire crossings is largely based on the National Electrical Safety Code, Handbook H-32. It should be noted, in this connection that, although most state regulatory bodies prescribe the same rules for construction of overhead crossings as the Safety Code, there may be stricter requirements in other states. For this reason telephone companies should obtain copies of regulations pertaining to wire crossings from the proper state authority and become familiar with such requirements.

Before starting the construction of a wire crossing at a railroad, the railroad company should be notified 30 days in advance of the proposed construction. Information as to the



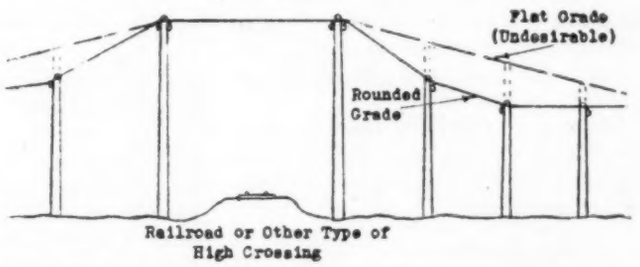
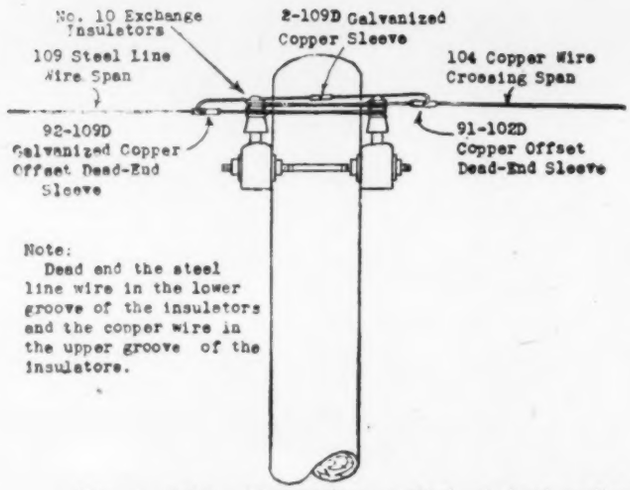


Fig. 1. (Left):—Minimum required clearances at crossings of telephone lines over railroad tracks at public right-of-ways. Notes: (1) Minimum side clearance measured from nearest part of pole or guy. At railroad sidings this minimum clearance is reduced to 7'0"; (2) Maximum for the crossing span carrying No. 12 N.B.S. copper wires.

Fig. 2. (Right):—How a telephone line should be graded over a railroad crossing.


No. 10 Exchange Insulators
109 Steel Line Wire Span
2-109D Galvanized Copper Sleeve
104 Copper Wire Crossing Span
92-109D Galvanized Copper Offset Dead-End Sleeve
91-102D Copper Offset Dead-End Sleeve
Note:
Dead end the steel line wire in the lower groove of the insulators and the copper wire in the upper groove of the insulators.

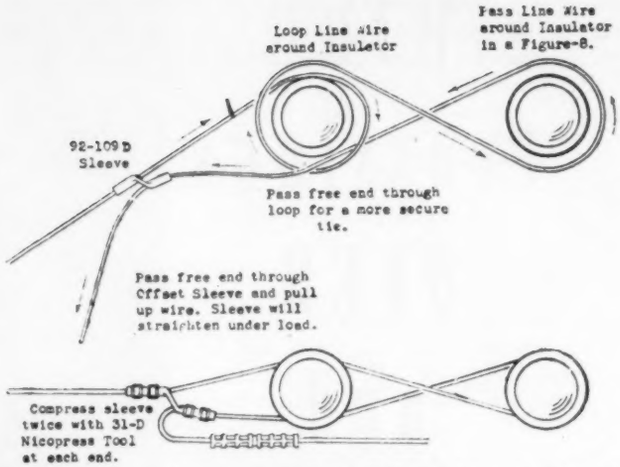

Loop Line Wire around Insulator
Pass Line Wire around Insulator in a Figure-8.
92-109D Sleeve
Pass free end through loop for a more secure tie.
Pass free end through Offset Sleeve and pull up wire. Sleeve will straighten under load.
Compress sleeve twice with 31-D Nicopress Tool at each end.

Fig. 3 (left)—Illustrating method of dead ending copper wire crossing span and steel line wire on railroad crossing poles. Fig. 4 (right)—Method of attaching line wire to insulators on a double arm.

type of crossing, whether under ground or overhead, the number of wires to be carried, sizes of poles, and the type of attachment to be used should be furnished to this company.

Clearance Requirements For Overhead Crossing Span

THE NATIONAL Electrical Safety Code specifies certain minimum side and vertical clearances for the crossing span and the poles and guys at the crossing. These requirements are as follows:

Minimum side clearances of railroad track from nearest pole or guy of crossing span measured to nearest rail of main track, 12 ft.

Minimum side clearance of railroad track from nearest pole or guy of crossing span measured to nearest rail of siding: provided that sufficient space is left for driveways at loading and unloading points, 7 ft.

Minimum height from top of track rails to lowest wire of crossing span, 27 ft.

Railway signals and signs at the crossing may require that the poles be set back more than the minimum permitted distance to avoid obstructing their view.

If the telephone wire crosses the railroad tracks over a private right-of-way, the railroad company will specify the minimum clearances desired.

Figure 1 illustrates the minimum clearances that are required for crossings at public right-of-ways (highways and roads.)

Grading The Line

BECAUSE taller poles than those in remainder of the line are required to obtain adequate clearance above the rails, the line will have to be graded up to the crossing poles. A "rounded" grade as shown in Figure 2 is preferrable to an even grade in order to avoid using a number of poles of varying lengths. Unless otherwise specified in state regulations, the amount of grade change in any span approaching the railroad crossing should not exceed ten percent of the length of the span involved in the grade change to avoid excessive strain on attachments.

The code specifies that the length of the crossing span shall, where practicable, not exceed 100 feet in the heavy loading district, 125 feet in the medium loading district, and 150 feet in the light loading district.

The size of the wire used in the crossing span shall not be less than specified in the following table:

Minimum Wire Sizes

	Spans of 125 feet or less	Spans 125 to 150 feet
Copper, hard-drawn	10 A.W.G.(.102)	9 A.W.G.(.114)
Steel, galvanized:		
In general	10 B.W.G.(.134)	8 B.W.G.(.165)
In rural districts of arid regions	12 B.W.G.(.109)	10 B.W.G.(.134)

The conductor material necessarily must be of a material that does not readily corrode, particularly in the case of lines near the coast where salt spray is carried inland for a considerable distance. Hard-drawn copper or galvanized steel of the sizes specified in the table on minimum wire sizes are required. Copperweld conductors may be used to advantage in the crossing span; provided that size used is not less than that specified for hard-drawn copper wire.

To avoid the necessity for purchasing and carrying odd sizes of line wires, it is recommended that span lengths be kept to 125 feet or less. This will enable standard No. 12 N. B. S. (.104) copper wire to be utilized in the crossing span, with the adjacent span composed of No. 12 B.W.G. (.109) iron where rural lines are involved. The wires should be strung at not less than the minimum sags specified in the Tables I and II.

If the crossing span must be longer than 150 feet, which is rarely the

Table I: Stringing Sags—Heavy and Medium Loading Districts

Length of Span (feet)	Temperature—Degrees F.					
	100	80	60	40	20	0
70	5.7	4.4	3.4	2.7	2.2	1.8
75	6.4	5.1	4.0	3.1	2.5	2.1
80	7.4	5.8	4.5	3.5	2.9	2.4
85	8.4	6.6	5.1	4.0	3.2	2.7
90	9.4	7.3	5.7	4.5	3.6	3.0
95	10.0	8.2	6.3	5.0	4.0	3.4
100	11.6	9.0	7.0	5.5	4.5	3.7
110	14.0	11.0	8.5	6.7	5.4	4.5
120	16.6	13.0	10.1	7.9	6.4	5.4
130	19.5	15.3	11.8	9.3	7.6	6.3
140	22.6	17.7	13.7	10.8	8.8	7.3
150	26.0	20.3	15.8	12.4	10.1	8.4

case, the minimum wire sizes must be increased or the wire sags made greater in proportion.

A suggested method of connecting the wires in the crossing span to the wires in the adjacent spans is illustrated in Figure 3. The dead ending arrangement for the wires of each span is shown in Figure 4. Insulators of double-groove type are required for this arrangement.

There should be no splices in the wires of the crossing span and the adjacent spans. If, however, a splice is necessary the splice should be as strong as or stronger than the conductor. Compression and rolled type sleeves will generally meet this requirement.

Pole Sizes

THE CROSSING poles should be of the proper length to provide adequate clearance of the line wires

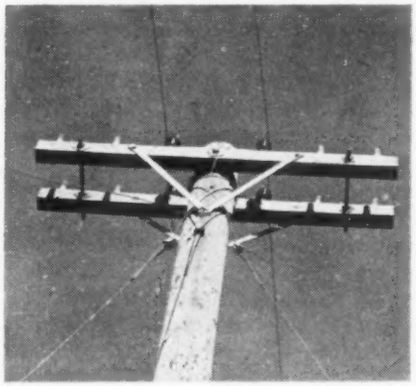


Fig. 5.—Double arm construction at crossing pole.

from the rails. In determining this length the following factors should be taken into consideration:

(1) Depth to which pole is set in the ground.
(2) Difference between level of crossing and ground line of pole.
(3) Minimum clearance between lowest wire in crossing span and top of track rails.
(4) Conductor sag.
(5) Spacing between crossarms.
(6) Distance between top crossarm and top of pole.

The class of pole to use depends on the length of the pole and the wire load to be carried. The proper class may be computed from storm loading formulae or determined by reference to handbooks now available to telephone companies. The minimum pole size should not be less than 15 inches top circumference, corresponding to a class 7 pole.

If the crossing poles are not side guyed, they should be selected to withstand vertical and transverse loads not to exceed 25 percent of

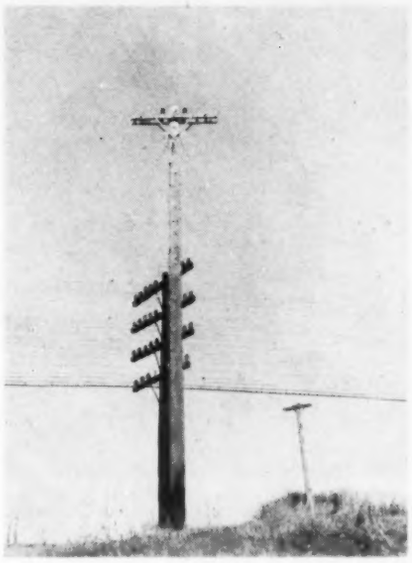


Fig. 6.—Two-wire overhead crossing with railroad tracks located in a depression and crossing poles located on to of opposite banks.

their ultimate stress and longitudinal loads not to exceed 75 percent of their ultimate stress as specified in the Code.

Poles from strong timber in good condition should always be selected for the crossing poles. Spliced poles should never be used. A stubbed pole is permissible only when the line crosses a minor railroad and the pole above the ground line is in sound condition.

The crossing poles should be erected in a straight line with other poles of the lead. If the poles cannot be in line, a guy is required at the corner pole to hold the unbalanced load.

The poles should be set to the following recommended depths:

Length of Pole	Depth of Hole
20 ft.	5′0″
25 ft.	5′0″
30 ft.	5′6″
35 ft.	6′0″
40 ft.	6′0″
45 ft.	6′6″
50 ft.	7′0″
55 ft.	7′0″
60 ft.	7′6″

Pole Attachments

CROSSARMS of the standard and "pony" types are satisfactory for use on crossing poles. The requirement, however, is that a double arm must be utilized as shown in Figure 5. Spacing bolts or spacing blocks with through crossarm bolts should be used to obtain a rigid construction.

Although it is preferable to use crossarms for two to ten wires, wood pole brackets may be used for a two-wire bracket lead. Two brackets mounted side by side with about one inch spacing between them are required to properly hold the wires. The crossing span and the adjacent span may be dead ended on double-groove insulators in the same manner as for the double arm arrangement.

The proper guying of the crossing poles is an important requirement. The poles should be head guyed away from the crossing span, and, in addition, side guys or braces should be used on poles supporting the crossing span unless the poles have adequate strength to withstand transverse and longitudinal stresses as previously explained.

If the line crossing the railroad changes direction more than 10 degrees (pull of 9 feet) at either crossing pole, the side guy within the angle may be omitted. The head guy should then be placed in the direction of the adjacent span unless the angle of the turn is greater than 60 degrees (pull of 50 feet).

Sometimes it may not be practicable to guy or brace a crossing pole. In this case, the line may be head guyed and the side guyed as near as practicable to the crossing but at a distance of not more than 500 feet from the nearest crossing pole. The line should be approximately straight, and steel strand of a strength equal to that of the head guy should be attached between the two guyed poles. Be sure that the strand is securely attached to the guyed poles and to every pole in between.

The sizes of the head guys are given in Table III.

The side guys when used in a straight section are considered to take the entire load in which they act without exceeding 37.5 percent of their ultimate strength.

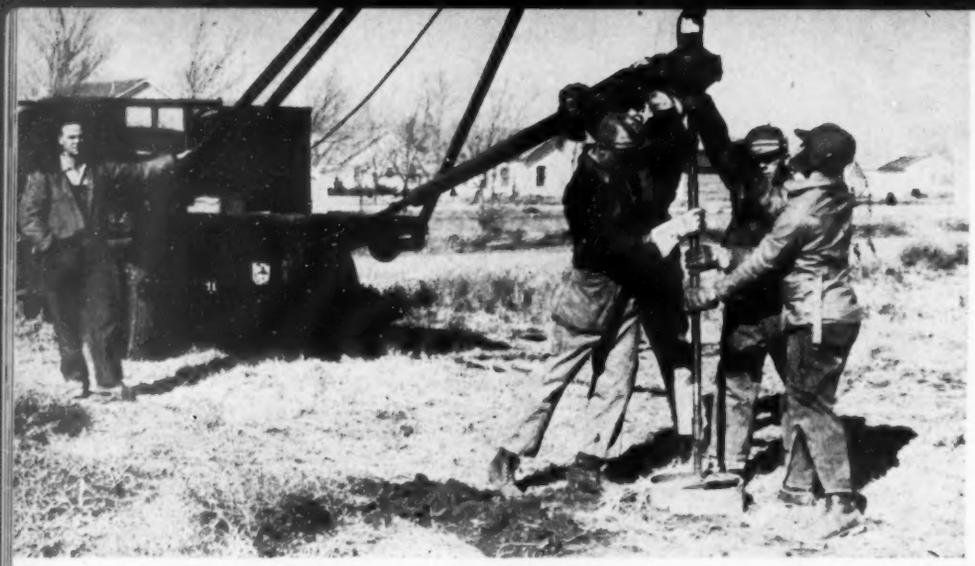
To avoid excessive strain on the pole, the Lead/Height ratio of the guys should not be less than ½ and preferably should be 1 or more.

Figures 6 and 7 illustrate typical overhead wire crossings.

Underground Railroad Crossings

AN UNDERGROUND railroad crossing may be installed when not more than four wires are involved. Such crossings are economical to place only when very tall crossing poles would otherwise have to be set and it is a comparatively simple matter to locate the conduit under the tracks. This is particularly the case when the railroad is on a high embankment. Figure 8 illustrates a typical underground railroad crossing construction.

(*Please turn to page* 54)



Endless vigilance on the part of every employee to reduce and eliminate unsafe practices is necessary at all times.

Accident Prevention --What Is It?

by

G. M. CUNNINGHAM
Supervisor of Safety,
Wisconsin Bell Telephone Co.
General Plant, Milwaukee

THE policy of our company as it concerns safety of employees has been re-affirmed in a manner which should leave no doubt in the minds of any employee as to what is expected in the elimination of accidents. While such an expression of policy is certainly an essential part of an accident prevention program, it is recognized that the policy is but the keynote of the program—the work begins after the keynote has been sounded.

How are accidents prevented? How does an organization go about reducing the number and frequency of accidental injuries? In spite of the fact that it adequately describes the ultimate objective, I have often regretted the term "accident prevention program." Too often our zeal to "prevent accidents" causes us to concentrate our attention on something which has already happened: particularly, if we have been shocked by the injury involved, and to overlook the fundamental conditions which made the accident possible and which if not corrected will continue to cause accidents.

Must Eliminate Unsafe Practices

THERE is little one can do about an accident which has already happened. The important activity is to determine what conditions made the accident possible and then to hunt down and eliminate similar conditions in every nook and corner of our operating territory.

An interesting, though somewhat theoretical, method of illustrating the real problem in preventing accidents is contained in the drawing shown on page 39. The figures, although based on considerable experience and observation, may vary under different conditions, and are used merely for the purpose of comparison.

Out of every 330 accidents we find that in 300 of these there is no personal injury nor necessarily any property damage. "But," you say, "if no one was injured, how can you call it an accident?" Well, why not? Lineman Jones climbs a pole without making the required tests or without providing the necessary temporary supports. The pole breaks and falls, carrying Jones with it, but by some stroke of good fortune the end of a crossarm strikes the ground first and the pole rolls over harmlessly. Jones is shaken up a bit and badly frightened, but otherwise uninjured.

Was that an accident? Certainly it was.

Identical Accidents

LINEMAN Smith, in another part of the territory, does the same thing, but in this case the rest of the crew may be called upon to lift the lifeless form of their fellow worker from the wreckage. Yes, there is a great difference between what happened to the two lineman, but the accidents were identical. Perhaps, too, the conditions which made these accidents possible—the short-cuts, the hurry-up complex, the "can't happen to me" attitude, and inadequate training and supervision were very similar.

What are we going to do about it? Smith may be dead—it may be too late to correct him. Jones? Anything you could say to Jones at this point would be superfluous. He learned the hard way and probably won't forget. Our problem is in the thousands of other times other poles are being climbed every day.

Let's say that a frameman leaves his longnose pliers on the steps of a rolling ladder in a central office. Another man moves the ladder and the pliers fall. Whether the pliers fall harmlessly to the floor or put out a man's eye, is purely a matter of chance. The *accident* is the same, regardless of the injury—major, minor, or none.

But to get back to the chart, and please remember that these ratios are approximate, it takes 330 *accidents to* cause 30 *injuries,* and, of every 30 injuries *one* will be serious enough to keep the man off the job for at least one full day, not including the day of the accident.

What's to be Done About Accidents?

NOW WHAT can management do about the serious injury besides provide the best medical and hospital care, and pay accident benefits to the employee or, perhaps, death benefits to his widow? What can the

company do about the minor injury outside of providing proper treatment to avoid more serious developments? As a matter of fact, what can be done about the no-injury accident? The accident has happened. It is water over the dam. It can no longer be prevented.

Oh yes, there are some accident prevention benefits which may be derived from an accident which has already happened. The man who has had the accident, and perhaps some of those who witnessed it, have had an object lesson which they may not forget for a while, particularly if the injury is serious. But does every installer have to fall backwards off a pole before he learns to use his safety strap properly? We certainly hope not.

Hazardous conditions grow like trees and must be weeded out if accidents are to be prevented.

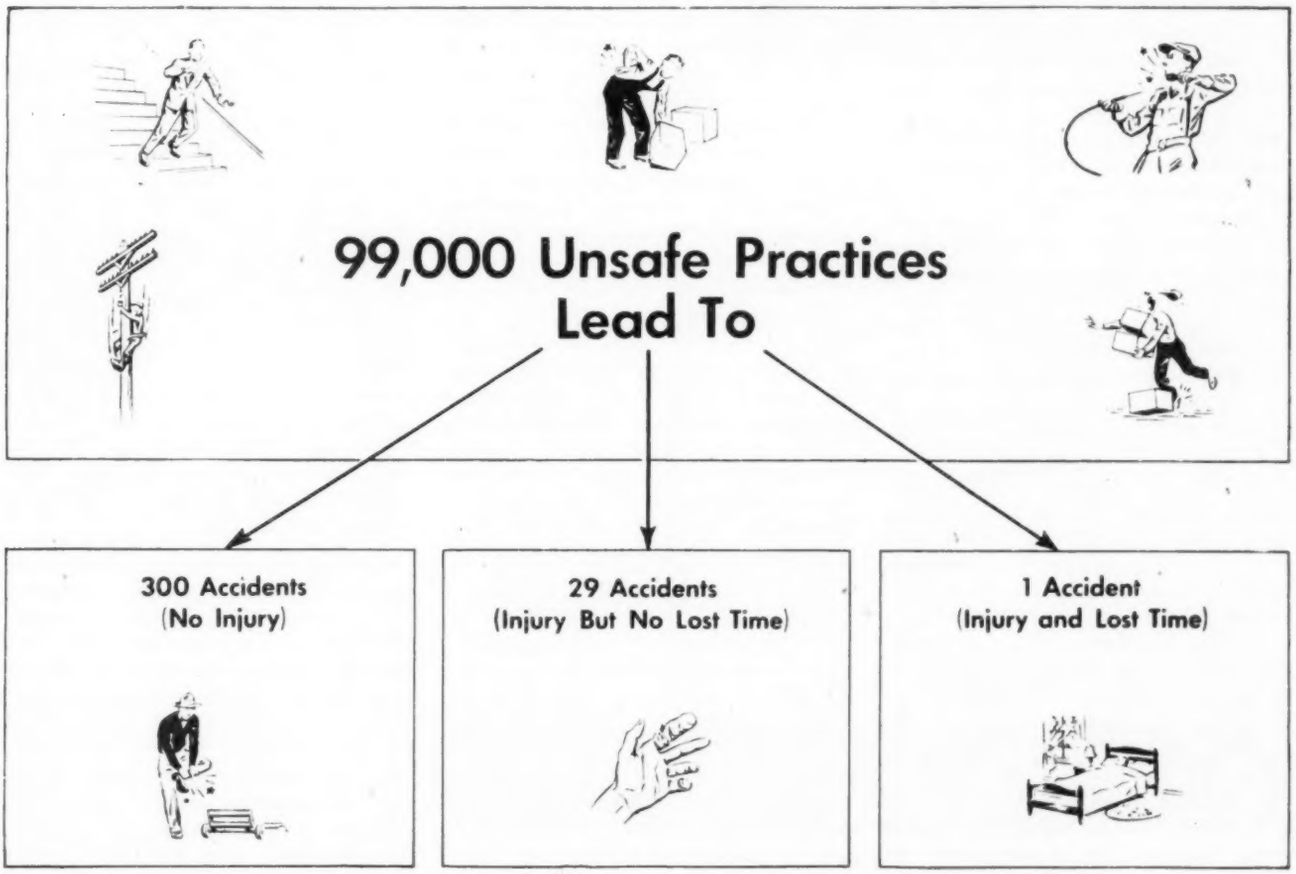
Background of Lost-Time Accidents

SO WHAT is the proper approach to the prevention of accidents? It has been estimated than an unsafe or improper working practice is repeated an average of several hundred times before it results in an accident. Suppose we set this figure at 300 repetitions. If that is the case, at the bottom of every lost time injury is a foundation of almost 100,000 unsafe incidents. And these unsafe practices, habits, conditions, reactions—call them what you will—are happening every day, being done knowingly or unconsciously, gathering—piling up, and for every 99,000 there are 330 *accidents*, of which 29 result in a minor injury and *one* disables the man involved.

Therein lies the science of preventing accidents. Endless vigilance on the part of every employee to reduce and eliminate the countless thousands of unsafe practices some of which are occurring every minute. Working under poles or ladders when another employee is aloft. Improper use of climbers—wearing them in trucks or while climbing fences or walking over uneven ground. Careless habits in the use of hand tools so that a slip would cause an injury. Lack of care on stairways or in dark places. Neglect of minor cuts and scratches. Hundreds of other failures of which every plant man is or should be, acutely aware.

What we are striving for is a safety program which, in addition to giving us more and more facts and data, gets us to apply and to put into practice, the wisdom and the common sense we already have.

The Employees' Benefit Plan takes splendid care of an injured employee. If we, as employees, will show as much concern for the one who is as yet uninjured, we will make telephone work even safer than it is, and at the same time hand our management a record of which they can be proud.—(*Courtesy Wisconsin Bell.*)



WASHINGTON

Bureau REPORTS

BY ROLAND DAVIES and FRED HENCK

Mobile Radio

THE SECOND full scale battle within four weeks to gain urgently-needed spectrum space for mobile and urban radiotelephone operations was slated to be staged before the FCC as TELEPHONE ENGINEER & MANAGEMENT went to press, with the tremendous interest in both proceedings and the large number of participants graphically illustrating the constantly-growing importance of the field.

Included in the 36 appearances filed for the general mobile hearings, scheduled to begin Dec. 8, were the American Telephone & Telegraph Co., the U. S. Independent Telephone Association, the General Telephone Corp., the Lincoln, Nebr., Telephone & Telegraph Co., and the Lee Telephone Co. of Martinsville, Va. The hearings, to take up allocations of frequencies to the ever-increasing number of mobile and special services and to seek a basis for placing some services on a regular basis, are expected to be among the most important staged by the Commission in recent years.

Illustrating their wide scope are the other companies and groups which have asked to present testimony. They include the American Taxicab Association, National Association of Taxicab Owners, Checker Cab Co. of New Orleans, Toye Brothers Yellow Cab Co. of New Orleans, National Bus Communications, American Automobile Association, American District Telegraph Co., Pacific Logging Congress, 1st Consolidated Publications and Subsidiaries, Western Union Telegraph Co., Transportation Communications Services, Inc., U-Dryvit Automobile Rental Co., Robert C. Crabb Telephone Exchange, Inc., Aeronautical Radio, Association of American Railroads, National Federation of American Shipping, Lake Carriers Association, Motorola, Inc., and Bendix Aviation Corp.

The Dec. 8 hearings overshadow in importance even the highly-controverted session late in November on the FCC's proposal to turn television channel 1 (44-50 megacycles) over to mobile services, while at the same time eliminating sharing of other television space by the mobile services. At that time, not only were common carriers and mobile communications organizations represented in profusion, but all major television and FM interests were on hand.

A decision by the Commission to make final its proposed order was seen at the conclusion of the hearings, with the added possibility that the agency might permit very limited sharing of some TV channels in areas where there is little or no demand for television service. All of the witnesses appearing, with the exception of maritime interests, emphasized their need for more spectrum space.

The order in the TV channel 1 proceeding, of course, would not include disposition of the 44-50 mc band as to individual mobile services, since allocations will be the subject of the session starting Dec. 8. Some of the mobile users, such as the taxicab operators, which have only two channels, received apparent Commission sympathy for their frequency needs, while others, notably the railroads, were criticized for their present use of available channels.

At the TV channel 1 proceeding, the American Telephone & Telegraph Co. urged that the FCC authorize its plan, under which fixed stations of telephone companies would not operate on frequencies used by TV stations within 125 miles, but would share video spectrum space at all other locations. Radio Planning Engineer H. I. Romnes criticized the FCC proposed report on the ground that non-sharing of the other TV channels would not be compensated for by the turning over to mobile operations of 44-50 mc. His testimony received little opposition, except from television interests on whether 125 miles would be adequate.

General Telephone Corp. Radio Engineer E. H. B. Bartelink compared the number of frequencies assigned to public utility common carriers for development of mobile radio service use against those allocated to television and declared the weight on the side of TV to be "all out of proportion". He stressed that release of any television channel would make available 25 channels for mobile service. Mr. Bartelink also pointed out that

➡ WHAT THEY'RE SAYING...

CARL D. BROREIN,
President,
Peninsular Telephone Co.,
Tampa, Fla.
(Excerpt from address delivered at recent convention of Florida Telephone Association.)

"However, we point out that when a ratepayer pays in taxes 45%, that is 25% plus 20%, more than the cost of his service, plus a reasonable profit, it places a burden on Regulatory Authority who has no control of the tax-take from the user, that can be serious in fixing rates which will not have the effect of limiting the use of the service.

"When the period of adjustment comes this can and will, in my opinion, be a serious handicap within our industry in our competition with other industry for the consumers dollar.

"Certainly any telephone company in the country operating in the red now would be in tip top shape if the 45% were available in additional rates instead of paid by the consumer for something he does not receive in service.

"I believe it is necessary before long that tax methods be devised, and I think they can be devised, whereby more equitable distribution of taxes can be accomplished before we endanger our economy by strangling the goose that laid the golden egg. Taxes paid directly by the telephone companies have increased approximately 300% in ten years from $437,000,000.00 in 1936 to $1,250,000,000.00 in 1946."

the FCC has made available only six channels for the development of urban mobile telephone service and short distance toll service and that "even the release of a single television channel in the higher frequency regions could materially alleviate the problems of the public utility telephone systems."

He also hit out at the comparative values of a "luxury service" such as television and the mobile emergency services. "It requires a great deal of imagination," he said, "to envision an occasion in which television could render services which are of an emergency nature."

◆

FCC Issues Final Order On Recorders

WITH ADOPTION of technical standards for a tone warning device, the FCC has issued a final order authorizing the use of telephone recorders on or after Jan. 15, 1948. The order also requires that the recorders be physically connected to or disconnected from telephone lines, or switched on and off at the will of the user, and that the tone warning device may be "furnished or maintained by anyone, whether or not a telephone company", as long as it fits the technical requirements laid down by the Commission.

Equipment necessary to connect the recorder to a telephone line, the Commission ordered, "shall be provided, installed and maintained by a company or other organization responsible for the furnishing of the telephone service."

The standards for the tone warning device call for a single tone which will be repeated during a telephone conversation about every 15 seconds and will be equal in strength to the average telephone talking signal strength. An FCC engineer described the tone as somewhat like a telephone busy signal but much higher and having no resonance as compared with a musical note. He said the tone will be "crisp", since it will last only 1/5 of a second each time it is sounded.

The order of the FCC does not require that the telephone companies carry directory designations on subscribers using recorders and on the matter of a campaign to inform the public of use of recording devices stated that "the telephone carriers . . . shall undertake an appropriate publicity program designed to inform telephone users generally of the use of telephone recording devices and of the import of the warning signal." Both the Bell System and the USITA had stressed to the Commission that recommendations such as a special

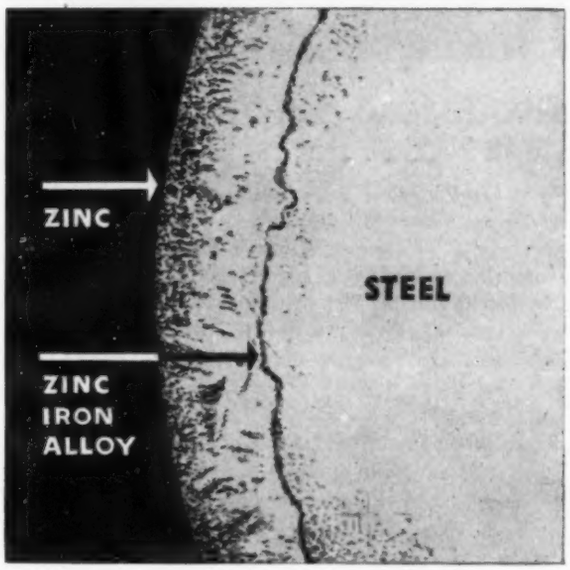
(Please turn to page 52)

You Save-because

Amerstrand

is "HOT PROCESSED"

Anaylsis of the "hot" galvanizing shown in th's microphoto reproduction indicates perfect bonding of the zinc with the steel base, thanks to a chemical blend of metals—pure zinc on the outside, an iron-zinc alloy increasing in iron content as it approaches the steel and the steel base. There is no cleavage surface where ductility is seriously decreased.



Strand that's strong—for years to come—is assured by Amerstrand "hot processed" galvanizing. The steel wire is passed through a bath of molten zinc which bonds chemically with the steel. This coating of pure zinc (99.99% pure) becomes part of the wire itself. It does not separate under the toughest tests, but stays on the job, preventing corrosion, preserving the original strength of the strand. For greatest overall economy order Amerstrand; sizes and grades to meet every requirement.

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PRACTICAL--

"HOW TO DO IT"

SUGGESTIONS...

by

MYRLE SHAFER

BASIC CLEARANCES FROM POWER WIRES . . .

TELEPHONE open wires and guys should have sufficient clearances from power wires and guys at crossings as indicated in Figure 1. The diagram applies to situations where the length of the power crossing spans not greater than 175 feet (150 feet if the power conductors contain strands 0.09 of an inch or less, as for example, copperweld 8-A, 9½D, 3-No. 12 and amerductor No. 12.). For longer power crossing spans, the indicated clearances must be increased in accordance with the National Electrical Safety Code requirements.

• • •

SOLDERING GUN "SPOTLITES" OPERATOR'S WORK . . .

THE TELEPHONE installation man, or the central office maintenance man will find especially useful a new type soldering gun featuring flexible "spotlited" top.

A small light, placed at the terminals of the loop tip, is beamed to keep the tip always in the spotlight, and therefore the work always in plain view. This greatly facilitates working behind a board or in a dark corner with a lot of wiring. The length of the tip and its flexibility to suit the job make it possible to reach deeper into the work and to easily manage "Corner" or otherwise difficult operations.

Soldering gun spotlights work.

The fast-heating feature makes the tool ideal for intermittent duty. Since the power is on only while the gun is in use, both power and money are saved. The gun operates on 60 cycle AC, 100 watts, 110 volts. Two models are available—one with a single heat of 100 watts; the other with dual heat, 100 watts normal heat, and 135 watts for intermittent duty.

• • •

NEW STRAND FORMING TOOL . . .

A NEWLY DEVELOPED tool, useful in working with strand, is now on the market. It simplifies guy wire forming and cutting operations, and results in substantially better work than is possible with ordinary hand methods. With this new tool, strand is placed in grooves in the tool and one turn of a wrench forms the strand into loops of such shape as to fit readily into guy clamps with a minimum of effort.

Strand sizes as large as 25,000 lbs. can

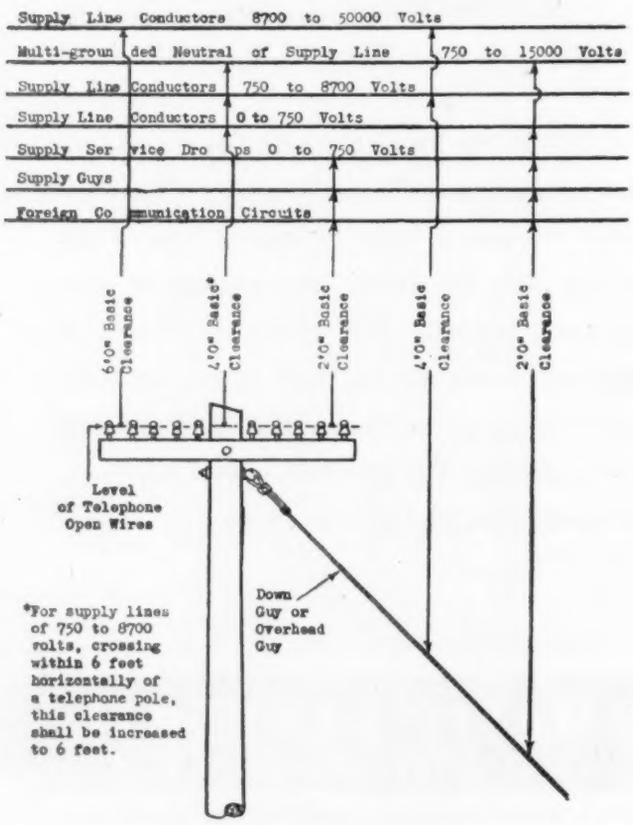
Supply Line Conductors 8700 to 50000 Volts
Multi-grounded Neutral of Supply Line 750 to 15000 Volts
Supply Line Conductors 750 to 8700 Volts
Supply Line Conductors 0 to 750 Volts
Supply Service Drops 0 to 750 Volts
Supply Guys
Foreign Communication Circuits
6'0" Basic Clearance
4'0" Basic* Clearance
2'0" Basic Clearance
4'0" Basic Clearance
2'0" Basic Clearance
Level of Telephone Open Wires
Down Guy or Overhead Guy
*For supply lines of 750 to 8700 volts, crossing within 6 feet horizontally of a telephone pole, this clearance shall be increased to 6 feet.

Fig. 1 — Illustrating minimum basic clearances of telephone wires and guys at wire crossings.

Fig. 2—New tool used for shaping strand to fit insulator or guy couple.

be cut with ease. The strand is measured to the desired length, and placed in a slotted knife which cuts the strand cleanly and easily when the handle is revolved. This tool would be particularly useful

Fig. 3—Tool used for cutting off end of a strand makeup.

with the larger size strand and convenient even for strand as small as 6000 lbs. Fig. 2 shows the new tool as used for shaping strand to fit an insulator or guy couple. Fig. 3 shows the new tool used for cutting off the end of a strand makeup.

• • •

EMPLOYE SURVEYS . . .

A PROMINENT PUBLIC opinion research concern recently completed a survey to determine how well informed employees of large corporations are and the effect of their being properly informed on their social thinking. The initial check was on the effect of proper and adequate information on management's problems on employee thinking. The group was divided into those that could qualify as "properly informed" because of their closer relationship to management, and those, for one reason or another, were relatively "uninformed" on company operations. Each group was given a series of questions. It was found that 32% of those in the informed group were pleased and satisfied with management and felt that management was revealing all important facts and progress reports. In the uninformed group only 13% were satisfied with company policies and methods. Fifty four per cent of the "informed" were opposed to government regulation of business as compared to 38% in the "uninformed" group.

Another similar test was made to determine the "left" or "right" leanings of the general public. Carefully conducted tests disclosed that in general, Democrats had greater tendencies toward collectivism than Republicans. Business executives, editors, the clergy and high school teachers all "leaned" decidedly to the right. But the manual workers, particularly the union manual group, leaned toward the left and collectivist theories. The definite conclusion was drawn from the study that lines of communication between the front office and the rank and file worker were not properly established and maintained. As the head of the research organization stated, "Management must get into the problem of how to communicate with its employees and keep them fully informed on the simple economic facts of life, particularly those that deal with their own business.

• • •

GROUNDWIRE CONNECTION . . .

WHEN A GROUND wire is connected to a water pipe, there is danger that pipe vibration may crystallize the copper conductor, causing it to break off at the ground clamp. To minimize the chance of such breakage, attach a fastener to the ground wire at least 6 inches away from the connection of the wire to the clamp. Leave a gradual bend of not more than ½ turn in the clamp. In the case of excessive vibration of the water pipe, it is advisable to attach the clamp near a pipe support.

• • •

"SOLDER-MATIC" ATTACHMENT FREES ONE HAND FOR OTHER WORK . . .

JOBS INVOLVING soldering operations are turned out faster and easier with the new "Solder-Matic" solder feeding attachment made by Nelpin Manufacturing Company, 45-17 Davis St., Long Island City 1, New York. This device, which smoothly feeds solder at the touch of the finger-tip, clamps on to any standard electric soldering iron.

One hand is free for other work with the new "Solder-Matic" feeding attachment, which fits any standard electric soldering iron.

By freeing one hand to manipulate parts, the new "Solder-Matic" saves temper, solder and time. It reduces rejects by enabling the operator to do a better job in crowded spots or awkward positions. By feeding exactly the amount of solder needed, at the right time and place, the "Solder-Matic" also eliminates molten solder drippage and improves quality of workmanship.

Solder in short lengths, in small coils, or fed from a spool as large as 25 lb., can be handled by the new "Solder-Matic." It takes solder from 1/16" to 3/16" in diameter, and feeds up to 3/16" per stroke. Screw adjustment of the stainless steel nozzle guides solder exactly where needed, regardless of the size or shape of the particular soldering tip being used. Liberal use of lightening holes in the "Solder-Matic" not only cuts weight but assures cool operation.

• • •

KLEIN INTRODUCES NEW CO-AXIAL CUTTER . . .

ALONG WITH the introduction of the newly developed co-axial cable which permits the sending of many messages over a single wire came a new problem of cutting. To meet this need, Mathias Klein & Sons of Chicago, manufacturers of a complete line of pliers, linemen's tools and linemen's equipment, developed a completely new cutter that shears clean and flattens cable ends in one operation.

Designed for one-hand operation, this new Klein Cutter operates on a shear principle with a convex blade working against a straight blade. The result is a cleaner cut and flattened end, thus preventing unwinding of the stainless steel shielding tape on the co-axial tube. Both .375" O.D. and .270" O. D. tubes are accommodated.

Each cutting blade is held accurately and firmly in the head of the tool by two countersunk set screws which pass through holes in the blades. These blades are easily replaced when necessary. Handles are tempered steel drop forgings of the same tool steel used in Klein Side Cutting Pliers. Long handles (cutter measures 8-¾" overall) provide powerful leverage. A descriptive folder is available from Mathias Klein & Sons, 3200 Belmont Avenue, Chicago 18, Illinois, upon request.

After you've installed a new dial switchboard . . . . . it's too late to find out what the new Leich Dial System could have done for you . . . .

WRITE FOR THIS CATALOG TODAY

This is a new kind of dial switchboard. It provides dependable, fast service, day after day, month after month, with little or no routine maintenance. There are no moving parts to wear or require intricate adjustment. The switches have been tested for 25 million operations without showing signs of wear or need for adjustment.

You can add 10 lines to the new Leich Dial System in 10 minutes. You can add a link in about an hour. No factory installer is necessary to do this. All parts are jacked-in.

No matter how large your exchange grows, the original equipment can be added to with a minimum of time, expense and trouble.

Because it is easier to understand and maintain, the average switchboard man can quickly learn to operate this new Leich Dial Switchboard.

Even the initial installation is reasonably simple. It should take two men about one week to install a 100 line board.

Surely, it might profit you to find out what this new Leich Dial System could do for you in your exchange. Literature, which describes it in complete detail, is now ready. Write for it today.
Use the handy coupon at the right.

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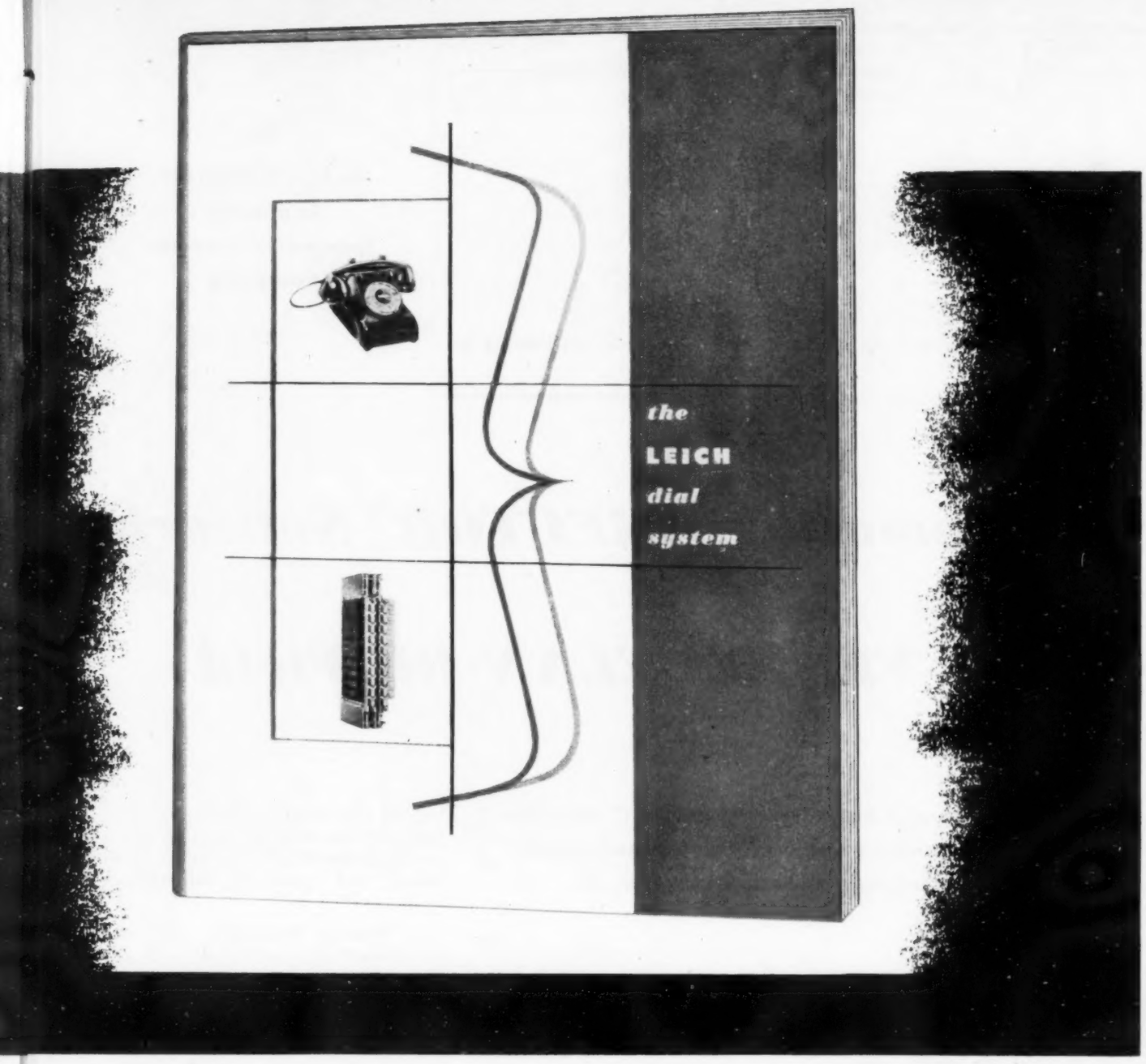

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Please send me the new catalog on the Leich Dial System. No charge or obligation.

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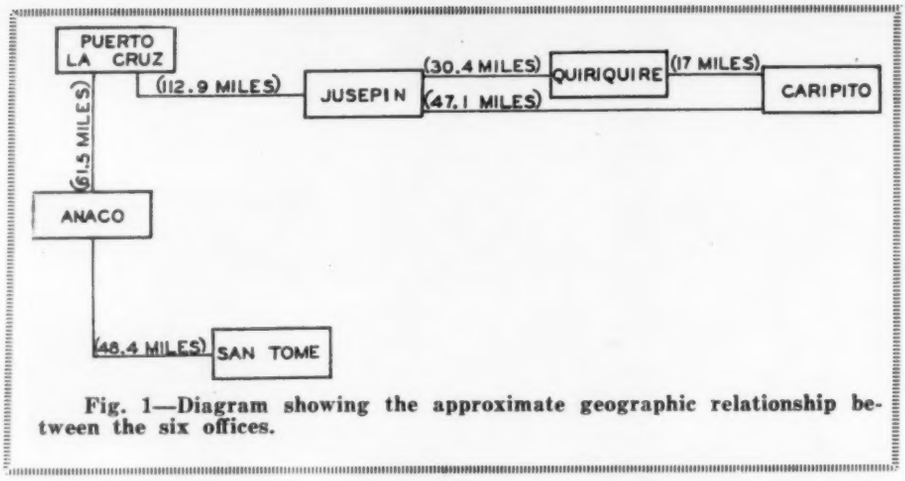


Fig. 1—Diagram showing the approximate geographic relationship between the six offices.

★

By

G. C. PLASMIER

Engineer,

Automatic Electric Company

★

An Automatic "DIRECTOR" Network In a VENEZUELAN Oil Field

HOW THE Strowger Automatic "Director" provides universal numbering and service discrimination in a six-office tandem trunking network.

THOSE OF US who are accustomed to driving an automobile into a gasoline station and asking the attendant to "fill the tank" seldom stop to think of the manifold operations within the oil industry that must precede the stage where the refined product is made available for consumption. Typical of these operations are the surveying of the oil basins, the drilling of the wells, the construction of pumping stations, the installation of pipelines, the various refining operations, and the transportation of many types of final products.

All these activities must be closely coordinated. To accomplish this in some of the newer oil fields which are located in primitive and relatively inaccessible regions is a complex and ponderous task, which calls for every possible use of modern labor-saving and time-saving methods. It can readily be understood what a vital part modern telephone communication plays in such an enterprise.

Strowger "Director" Meets Requirements

ONE SUCH project that is currently making history is represented by the combined operations in the East Venezuelan oilpool in South America, of the Mene Grande Oil Company and the Creole Petroleum Corporation. Here the oil companies' activities are scattered over a wide area, having six different operational headquarters strategically located, with the two extreme points of operation separated by approximately 270 miles.

Modern communication facilities knit together the various operations and the activities of their administrative staffs. This article proposes to show how Strowger Automatic telephone equipment with the addition of the Strowger "Director" has been able to meet the exacting service requirements of this project on a sound and practical engineering basis.

A Strowger Automatic telephone switchboard is installed in each of the six operating headquarters to serve the community telephone needs of that locality. The nature of the oil companies' operations, however, is such that it also requires speedy intercommunication between these six operating points. Each of the six automatic switchboards is therefore a segment of a six-office automatic network, with facilities for establishing connections to any telephone in any office.

Figure 1 shows the approximate geographic relationship of, and distances between, the six automatic offices. In a public telephone system, calls over such distances would be subject to toll charges, and would normally be handled by toll operators. This long distance network, however, is built, owned and operated on a full-automatic basis, for the sole benefit of the petroleum organizations. No charges are therefore made for calls between offices, though use of long distance circuits

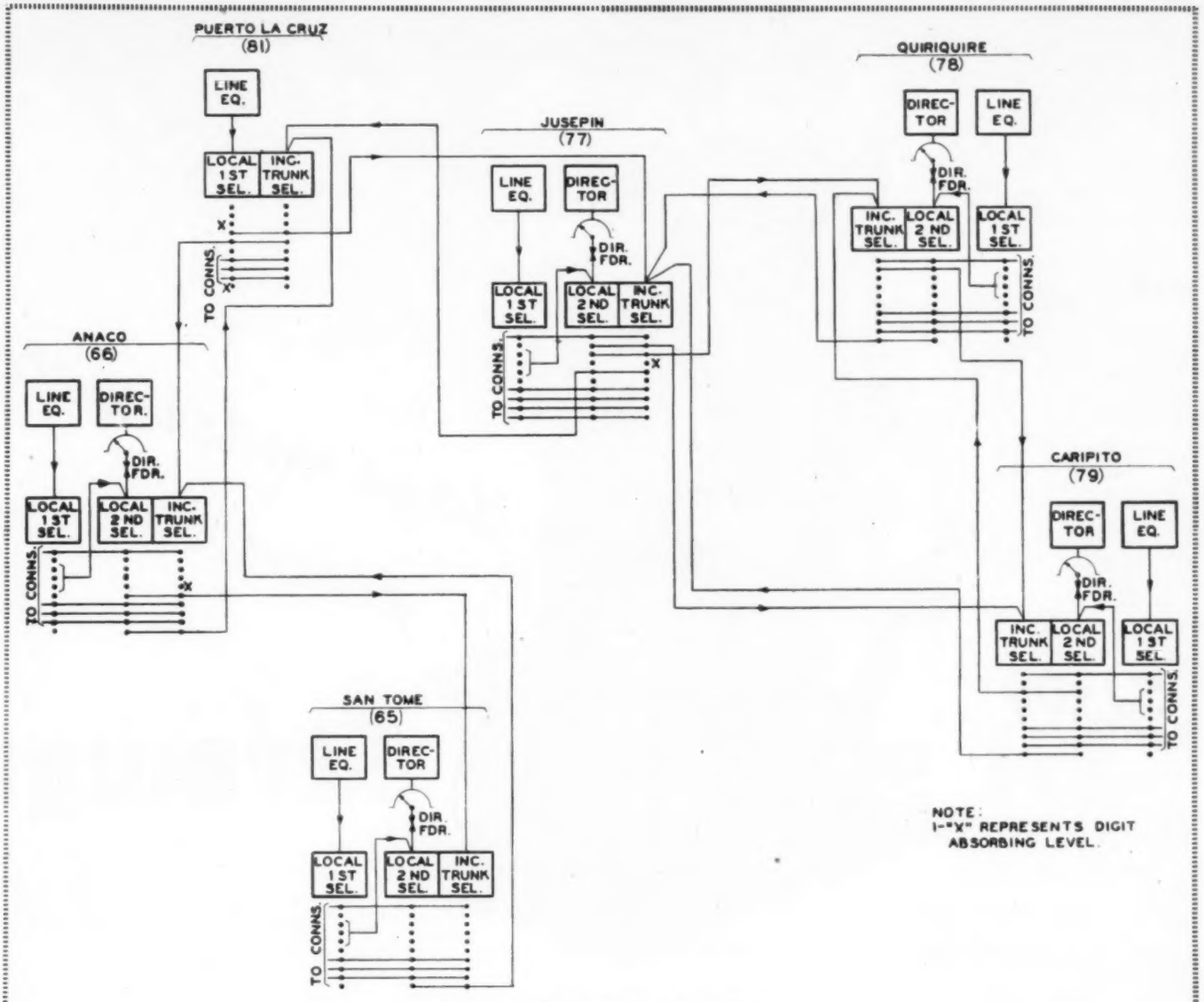


Fig. 2—Condensed trunking diagram.

involves certain restrictions, for reasons which will be explained later.

The six telephone offices are trunk-connected in tandem as shown in Figure 1. In such a network, to establish a connection between two lines terminating in the same office presents no special engineering problem, since only sufficient digits need be dialed to connect the calling and called lines. In this case, three digits would suffice, since each office has less than 1000 lines. Also, under straightforward step-by-step operation, to establish a connection between lines terminating in adjacent offices presents no special problem, although a four digit number would be required. As the number of tandem offices increases, the number of digits needed to complete a call between the most widely separated pair of offices must also increase. Thus, a call between the "end" offices of a five office tandem group would require a seven digit call number, four digits of which would be used to route the call through the intermediate offices.

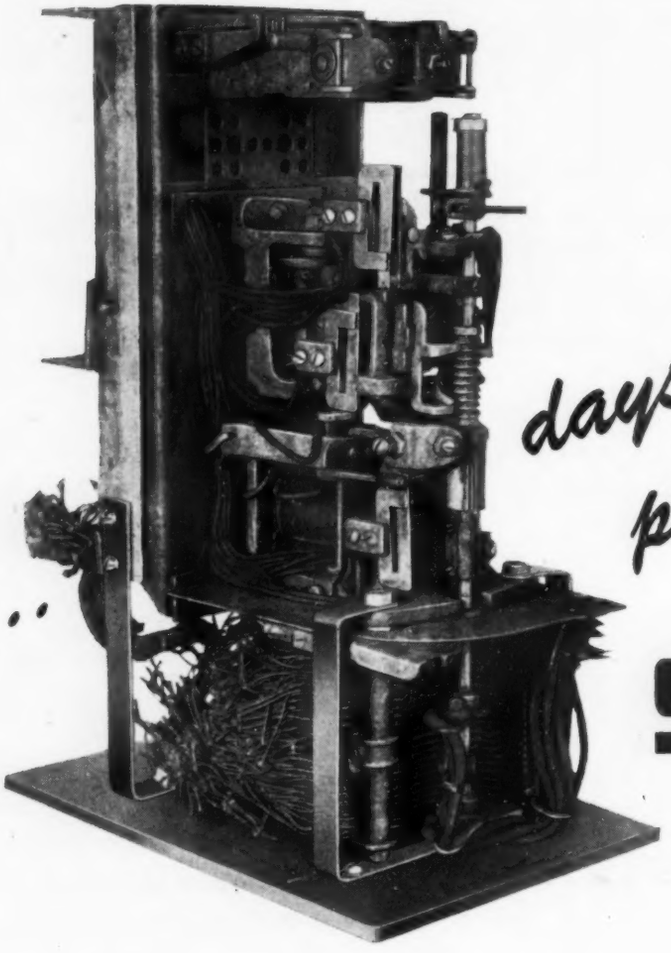
People who are constantly located in the same office area would encounter no difficulty since the number of digits to be dialed to reach any given station anywhere in the network would always be the same. However, operating personnel traveling over the entire property would have to make use of special dialing instructions each time a call was made, as the number of digits to be dialed to reach a given station would vary depending on the point of origin of the call.

Obviously, in a network of this kind where calls are freely dialed between offices and where the nature of the business requires extensive field operations, it would be simpler, if, to reach any given station, users in all offices could dial the same call number. This simplicity of universal numbering is illustrated in the ordinary multi-office city telephone network where the call number for any station is the same no matter who does the calling and from which office the call is being made.

Universal Numbering In Tandem Network

In a city network, universal numbering is usually made possible by having direct trunk lines between all offices. The network in Figure 1, however, does not lend itself economically to this method of trunking due to the great distances between offices. Another method must therefore be employed, involving the use of facilities that will allow universal numbering and direct a call to its

(*Please turn to page* 50)



Sixty... *days under water prove...*

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r switches can take it!

The U. S. Cruiser Savannah took a direct hit off Salerno, Italy. For sixty days, sea water and fuel oil flooded many of her below-decks compartments. Millions of dollars' worth of vital machinery and apparatus was destroyed. But after a superficial cleaning, this Strowger switch, taken from her wrecked switchboard, was ready to operate again!

There was nothing special about this switch—just the same standard materials, finishes and construction that you get in all Strowger Automatic equipment. Here is proof that Automatic Electric standards provide a wide margin of safety over all ordinary demands.

Of course, *your* equipment will never be subjected to such rugged treatment. But you will be glad to know that Strowger Automatic equipment is built to take it.

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus
Electrical Engineers, Designers and Consultants

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destination regardless of the number of intermediate switching points required to extend the connection from the calling to the called station.

Such facilities are made available by the introduction of the Strowger Automatic "Director" in this network. The essential function of the Director is to *register* the digits dialed by the person making the call and to *translate* that portion of the call number which represents the "office code" into the particular digit or combination of digits needed to extend the connection to the terminating office. The digits representing that portion of the call number which relates to the particular station or line in the terminating office are re-transmitted in the same order and value as dialed.

Physically, the "Director" is a simple assembly of relays and stepping switches of the same standard types used for other switching functions in a Strowger Automatic exchange, and therefore involves no new or untried mechanisms. It is only another, and, in fact simplified, version of the Director originally designed to solve the complex trunking problems inherent in large metropolitan telephone systems, such as the London, England, network.

The oil companies' telephone network is divided into three zones with each zone harboring all the activities for a given area. San Tome and Anaco constitute one zone; Quiriquire, Caripito and Jusepin constitute a second zone. Puerto La Cruz, which is the Caribbean pipeline terminal for both these zones, constitutes the third zone.

All offices except Puerto La Cruz are equipped with Strowger Directors. The physical location of Puerto La Cruz in the network, and the choice of office prefixes, make it possible to dispense with Directors in this office. (Puerto La Cruz is located midway between the other two zones and the telephone calls originated in this office need never be relayed through more than one tandem office with the present network.) Should, however, additional offices be added at the extreme ends of the network at a later date, then Directors will also be installed at Puerto La Cruz. No modifications of existing equipment will be required at that time, as the Directors will be merely inserted in the present switch train.

A five digit numbering system is employed. The first digit determines the zone for which the call is intended. The second digit selects the office in that zone and the final three digits select the individual line in that office. The actual number and variety of digits transmitted by the "Director" to complete a call, however, varies depending upon the office at which the call was originated and the office to which the call is destined. Each of the six offices in the network has a two-digit office code number as follows: 65 for San Tome, 66 for Anaco, 77 for Jusepin, 78 for Quiriquire, 79 for Caripito and 81 for Puerto La Cruz. Each group of offices forming a zone employs the same first digit as part of the office code number. It should be noted that the second digit of the two-digit office code number is different for each of the six offices. That digit is the first to be received by the Director, as shown in the condensed trunking diagram in Figure 2.

FROM \ TO	SAN TOME (65)	ANACO (66)	PUERTO LA CRUZ (81)	JUSEPIN (77)	QUIRIQUIRE (78)	CARIPITO (79)
SAN TOME (65)	–	1	11	117	1178	1179
ANACO (66)	5	–	1	17	178	179
* PUERTO LA CRUZ (81)	65	66	–	77	78	79
JUSEPIN (77)	665	66	6	–	8	9
QUIRIQUIRE (78)	1665	166	16	1	–	9
CARIPITO (79)	1665	166	16	1	8	–

**Puerto La Cruz office is not equipped with Directors. Therefore digits transmitted from this office (on originating calls in this office) are actual digits dialed.*

Fig. 3—Chart showing scheme of digit translation provided by the Directors.

The second digit of the office code actually indicates to the Director which terminating office is desired. This digit is translated by the Director into other digits, or into a single digit, as required to reach the incoming trunk equipment in the terminating office. The translations of this second digit by the Director on calls between various pairs of offices are shown in Figure 3.

To illustrate the effect of translation, let us consider a call from Quiriquire to San Tome. The first two digits of all San Tome call numbers are 65. Dialing of the first digit operates a local first selector at Quiriquire, and extends the connection to a local second selector and a Director in the same office. The Director accepts the second digit, 5, and translates it into the sequence of digits 1665, which route the call through Jusepin, Puerto La Cruz and Anaco, and then to an incoming selector at San Tome. This routing may be followed by reference to Figure 2. The remaining three digits of the call number are sent by the Director without change, and serve to operate the local switches in San Tome to complete the connection to the called station. After the Director has completed this function, it is disconnected and is then available for use on other calls.

The digit or digits sent out by the Director are selected to correspond with selector levels that are available in the various offices for selecting of trunks to the adjacent offices. This makes maximum use of the selector equipment. In case of future growth, changes can be made as required if the selector level used by the Director for routing the call is to be utilized for other services.

Versatility Of The Equipment

THE VERSATILITY of the equipment is further illustrated by its ability to make the pulses delivered by the Director agree with those delivered by the dial under control of the calling party. On calls originated in Puerto La Cruz the various selector switches respond to the actual pulses corresponding to the office code dialed. The Directors transmit these same pulses when routing a call through Puerto La Cruz.

Only those digits that are required to establish a trunk connection to the terminating office are newly created by the Director. The final three digits of the five-digit directory number are stored in the Director until after it has completed the transmission of the routing digits, and are then re-transmitted by the Director in the same sequence and the same value as dialed.

The Directors for this installation are capable of transmitting a total of five routing digits to reach the terminating office and have facilities for transmitting a total of ten different routing codes; i.e. the Director is designed to handle calls to a total of ten different offices. Cross-connecting facilities are incorporated in each Director so that by the simple process of changing wiring on a small terminal strip the Director can be made to translate any office code it receives to any of ten groups of numbers, each group consisting of any number of digits from one to five.

As previously indicated, the office code numbers are selected to permit

the equipment in Puerto La Cruz to complete all calls to the proper zone and the desired office in that zone on a regular step-by-step basis without need for Directors. This can readily be understood from a study of Figure 2. For example, when a telephone call is originated in Puerto La Cruz and is intended for completion in Puerto La Cruz, the first two figures (representing the office code) are absorbed by the local first selector. Likewise, when a call is intended for completion in an adjacent office, the second digit of the office code number is absorbed in the terminating office.

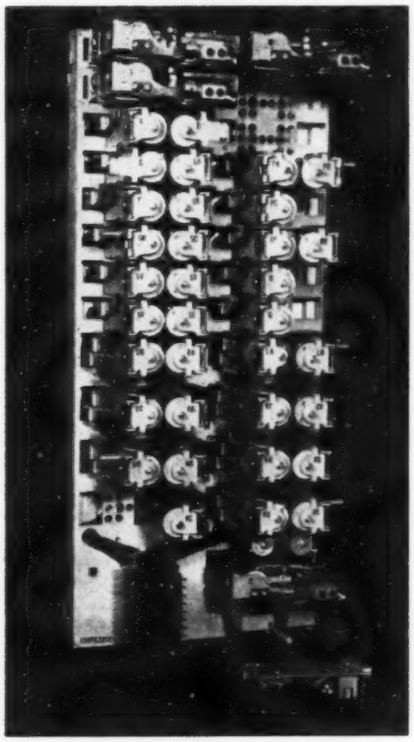

Fig. 4—The Director as used in the Venezuelan network.

The oil lands served by this network are for the most located in uncharted parts of the country and the oil companies are pioneers in introducing to these sparsely settled areas some of the modern conveniences of civilization. Due to the nature of the country and the distances between telephone offices, construction costs for long distance networks are high; hence, it is essential to limit the total number of circuits between offices to an economical figure. Therefore, only such calls as are "necessary" are permitted between offices.

To restrict the inter-office telephone traffic to essential needs, only a limited number of operating personnel of the oil companies who have business in all the areas are permitted to make telephone calls to any point in the system. The activities of certain other personnel extend only to the zones in which they are located; still others have duties that are confined to the particular office in which they are operating. This results in three different classifications of service—unlimited, semi-restricted and local.

Policing of Calls

IN VIEW of the absence of operators, compliance with restrictions must be automatically enforced and not left to personal judgment or individual discretion. This policing of the calls is a further function of the Strowger Director. If the telephone call is from an "unlimited" telephone station, the Director gives such a call the "go ahead" signal and routes it to its final destination unhampered. Should, however, a call intended for completion in another office be attempted from a telephone limited to local service, the Director halts the progress of the call and relays it to an individual designated to answer all "irregular" telephone calls. Similarly, semi-restricted stations are prevented from reaching other zones to which they are not entitled to make calls. (The requirements in Puerto La Cruz

(*Please turn to page 72*)

Keep poles straight . .
With
CHANCE
POLE KEYS
Prevent poles from leaning with unbalanced loads by reinforcing them in this inexpensive and highly efficient manner.
Field tests show that the Chance Expanding Pole Key has approximately 50% greater efficiency than the old type wood key which rests entirely in tamped earth. It may be installed in fifteen minutes, compared to the one to three hours required to install a wood key at the base of a pole. The sketches at right show how the Chance Key is expanded into solid earth.
Write for details.
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Line Tools...
for Construction and Maintenance
PIKE POLES · PEAVIES
WIRE GRIPS · TACKLES
CANT HOOKS · LUG HOOKS
PAYOUT REELS
Experienced crews prefer Dicke line tools for construction and maintenance work. They depend on their rugged durability—their tough, sure strength in the pinches. From pike pole to payout reel Dicke line tools are uniformly satisfactory. You'll find a Dicke tool for every construction need—all listed in the Automatic Electric catalog.
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BULLETIN

LINEMEN'S TOOLS

All the tools you need for line construction and maintenance are distributed by Graybar. Leading manufacturers have designed and made these tools to do the best job in the shortest time with the greatest safety to your men.

There's still a shortage of certain tools, but conditions are improving, and you'll find our near-by warehouse prepared to deliver many tools and other pole-line supplies whenever and wherever you want them.

...AND FWD TRUCKS

Graybar distributes the entire line of Four Wheel Drive trucks and trailers, derricks, winches, and accessories. The efficient design, rugged construction, and smooth operation of these units contribute speed and safety to line construction and maintenance. Ask your local Graybar Representative for full information. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.* 4748

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IN OVER 90 PRINCIPAL CITIES

HOW GRAYBAR SIMPLIFIES YOUR ELECTRICAL BUYING

Graybar makes it possible for you to obtain — from a single convenient source — many thousands of first-quality telephone supplies and other electrical items, made by over 200 leading manufacturers. Through its 95 offices and warehouses, Graybar shortens the economic distances between 200 makers and 35,000 users. One order, one responsibility, one invoice does the work of many.

Washington Bureau Reports

(Concluded from page 41)

telephone number to reproduce the warning signal and directory advertisements would involve considerable expense and burdensome operating arrangements, particularly among the small Independents.

◆

Excise Reduction

FURTHER AMMUNITION for the removal or reduction of the excise taxes paid by users of communications services was contained in a report of the Library of Congress Legislative Reference Service made public recently. The Service is established to provide reference data for members of Congress, and seldom makes public reports of the material it gathers.

The report made no recommendations, but its summarization of arguments by proponents and opponents of communications excises showed that the weight of the argument has been on the side of those advocating a diminution or repeal of the levies.

Summarizing the position of opponents, the report said "Perhaps the most unexplainable feature of these taxes is the rate. If one goes to a night club or buys expensive jewelry, he pays a 20% tax. If he uses public transportation on a vacation, he pays a 15% tax, if he buys a radio he pays a 10% tax, but if he makes a long distance business telephone call or sends a telegram, he pays 25%.

These taxes are imposed on business and social necessities, are based on no sound principle of taxation, and are without justification in peacetime. They can hardly be classed as luxuries, yet they are taxed at rates higher than the tax on most luxuries. They discriminate against businesses which have to make frequent use of communication services. They also discriminate against certain sections of the country (especially the West) often far removed from the centers of population. The taxes which are a percentage of the rate—which is in turn largely based on distance—fall heavier on one section of the country than another. The taxes also present an additional deterrent to extension of rural lines."

Minimum Wage

CONTINUED reports that the Republican Congressional leaders favor lifting of the statutory mini-

mum wage to 60 or 65 cents an hour, but with few other revisions of the Fair Labor Standards Act, came at the conclusion of hearings on revamping of the wage-hour legislation before a House Education and Labor subcommittee. No change is considered likely in the 500-station exemption for Independent telephone exchanges in regard to operators' salaries.

It is reported that most GOP members do not wish to enact any more sweeping labor legislation until it is seen how the Taft-Hartley Act works out in practice. The consensus may also doom a proposal by Labor Committee Chairman Fred Hartley for a bill to prevent interference with non-striking employees during walkouts, on which hearings are to begin Jan. 21. It is understood that the violence during the strike of North Electric Co. employees had much to do with Rep. Hartley's decision to offer such a bill.

In the light of the political emphasis on raising the wage minimum, it is expected that Labor Committee leaders will consult closely with the GOP strategists in both Congressional chambers before offering a Committee measure to revise the Fair Labor Standards Act. Committee sources anticipate that the conferences with Republican leaders will take place before a bill is written. There may, it is thought, be additional hearings on the bill as offered following its introduction in the House. But the advance endorsement by the Republican policymakers in both houses may avoid further time-consuming hearings.

◆

Associated Company Passes Quarter-Million Station Mark

On November 25, Associated Telephone Company, Ltd., Santa Monica, California, put into service its 250,000th telephone, according to president Edwin M. Blakeslee. This represents a gain of 186,066 stations since the company commenced operations in September, 1929. With the initial station mark of 63,934 almost quadrupled, it is estimated that approximately 55,000 additional stations will be added before the end of 1948.

Acquisitions to company property have been responsible for 40,920 of the stations added since the company's inception. In 1932, when the Associated company was serving slightly more than 65,000 stations, acquisition of the Pomona and Ontario exchanges raised that number by 13,635.

Nine years ago this month the company passed the 100,000 station mark, and a year later acquired the Santa Barbara company with 18,641 stations. Before the start of World War II, the Associated Company was serving 150,000 telephones.

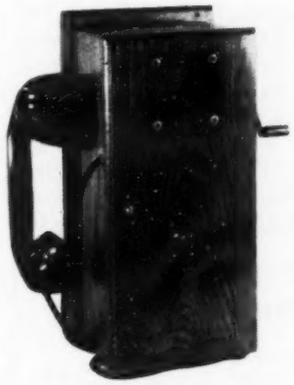
The New Smaller Size Cabinet

of the **BANTAM**

MAGNETO WALL TELEPHONE

is Popular with Subscribers

Only 13" x 15" Wall Space Required



LATEST STYLE HANDSET

of handsome black plastic with sealed capsule type transmitter and receiver units provides exceptionally clear voice transmission and long, trouble-free service.

Electrical Circuit

is that used by the Signal Corps on telephones similar to farm telephones. It includes an anti-sidetone induction coil and a condenser in the receiver circuit.

These are NOT Rebuilt Telephones They are—

BRAND NEW... Strongly Built... Nicely Finished...

THE MIGHTY MIDGET GENERATOR, equipped with Alnico magnets, is extremely small, measuring only 3½" x 3½" x 4", yet more powerful than many of the largest old style 5 bar generators, insuring plenty of ringing current to overcome adverse conditions. Alnico magnets are fifteen times more powerful than good magnets of the old style.

"SILENT RING" wired so that the bell will not ring when calling central or making other outgoing calls. The ringing circuit is so arranged however, that incoming calls will ring even though the handset is off the hook. ENDORSED by and now being installed by many of the largest of the independent operating companies in the country.

UNCONDITIONALLY guaranteed to give satisfactory service.

Bantam Magneto Wall Telephone with 1600 ohm ringer **$28.00**

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IMMEDIATE SHIPMENT

Order Today

DAN'L H. McNULTY, President & Manager

'Since 1926'

TELEPHONE REPAIR & SUPPLY COMPANY

1760 Lunt Avenue **Chicago 26, Illinois**

Wire Crossings at Railroads

(Continued from page 37)

Before placing the conduit, the poles should be set at the proper distance from the tracks on each side to enable full lengths of the conduit to be installed without cutting. Down guys with a Lead/Height ratio of not less than 1, if practicable, should be installed on the poles as indicated in Figure 8. In compliance with the requirements of the Code, the guys should be located at not less than 12 feet from the nearest track rail on each side of the crossing.

A trench is dug for the conduit from the crossing pole to the embankment on each side, making the excavation at least two feet below the surface of the ground at the lowest point and at least 42 inches below the track rails as required by the Code. The bottom of the trench is made to slope about 3 inches per 100 feet so that moisture accumulating inside the conduit will drain towards a sump at the lower end.

The construction of the sump is shown in Figure 9. The purpose of the sump is to accumulate water that drains out of the conduit and allows it to seep into the ground.

A pipe pushing machine may then be used to force one or two lengths of conduit through the railroad embankment. The rest of the conduit is then laid in the trench. This conduit comes in ten-foot lengths and are joined together by means of pipe couplings. At the location of the sump, a pipe tee is joined to the end of the conduit, then an ell to the tee, and finally a ten-foot riser pipe to the ell. At the other end of the conduit run, an ell is joined to the conduit, and a ten-foot riser pipe is connected to the ell. White lead or pipe dope should be used on the threads to insure water tight joints.

At the top of each riser pipe, attach

Table II: Stringing Sags—Light Loading District

Length of Span (feet)	Temperature—Degrees F.						
	110	100	80	60	40	20	10
80	5.5	5.0	4.2	3.4	2.8	2.4	2.2
85	6.2	5.7	4.7	3.9	3.2	2.7	2.5
90	7.0	6.4	5.3	4.3	3.6	3.0	2.8
95	7.8	7.1	5.8	4.8	4.0	3.4	3.1
100	8.6	7.9	6.5	5.3	4.4	3.7	3.5
110	10.4	9.5	7.8	6.5	5.4	4.5	4.2
120	12.4	11.3	9.3	7.7	6.4	5.4	5.0
130	14.6	13.3	11.0	9.0	7.5	6.3	5.9
140	16.9	15.4	12.7	10.5	8.7	7.3	6.8
150	19.4	17.7	14.6	12.0	10.0	8.4	7.8

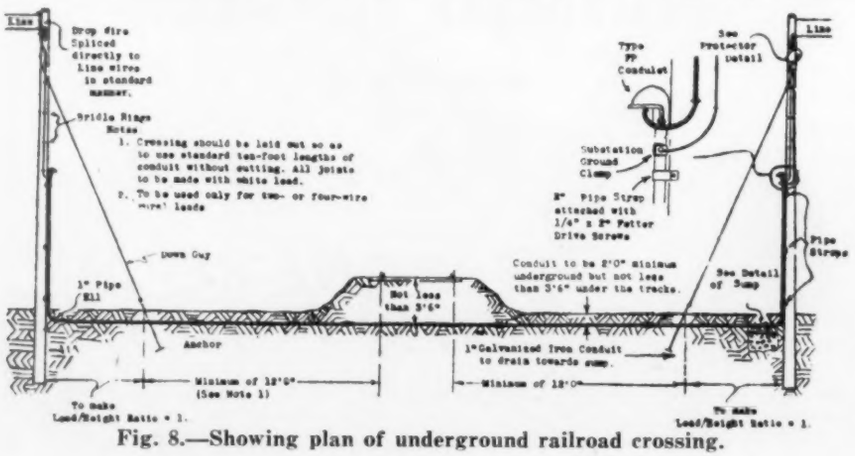
Line
Drop Wire Spliced directly to Line Wires in standard manner.
Bridle Rings
Notes
1. Crossing should be laid out so as to use standard ten-foot lengths of conduit without cutting. All joints to be made with white lead.
2. To be used only for two- or four-wire metal leads
Down Guy
1" Pipe Ell
Anchor
Minimum of 12'0" (See Note 1)
To make Lead/Height Ratio = 1.
Not less than 3'6"
Type PP Conduit
See Protector Detail
Line
Substation Ground Clamp
#8 Pipe Strap attached with 1/4" x 2" Potter Drive Screws
Pipe Straps
Conduit to be 2'0" minimum underground but not less than 3'6" under the tracks.
See Detail of Sump
1"Galvanized Iron Conduit to drain towards sump.
Minimum of 12'0"
To make Lead/Height Ratio = 1.

Fig. 8.—Showing plan of underground railroad crossing.

STROMBERG–C

cook no. 3800

central office protector

Combines cable termination with protection of central office personnel and equipment against high potentials and sneak currents. In operation, it opens the switchboard circuit, grounds the outside line, and operates an alarm circuit. Note these construction and operating features:

1. Provides for temporary disconnect.
2. Self-soldering, low-resistance heat coils easily reset after operation without changing, reversing or re-soldering coils.
3. Line and switchboard connections on opposite sides of protectors.
4. Steel mounting plate for maximum strength.
5. Unit dischargers, consisting of two carbons, separated by acetate dielectric cemented together, permanently grounds the outside line under continuous discharge.
6. Easily tested without removing heat coil; withdrawal of test plug leaves protector in operating condition.

STROMBERG–C

BRANCH OFFICES: CHICAGO 6, KANSAS

G–CARLSON Recommends

habirshaw no. 17 bronze drop wire

NO. 17 BRONZE PARALLEL NEOPRENE SHEATHED DROP WIRE

NO. 17 BRONZE TWISTED PAIR NEOPRENE SHEATHED DROP WIRE

Stromberg-Carlson offers these two new Drop Wires with five important features:

1. High Dielectric Strength.
2. Flame-Resistant—Sheath will not conduct flame.
3. Weather-Resistant—No exterior braids to weather and festoon; impervious to effects of moisture, acids, oils, and factory fumes.
4. Mechanically Strong.
5. Time-Tested.

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reliable *drop wire clamps*

***Manufactured by* RELIABLE ELECTRIC COMPANY**

Type "P" is designed for twisted pair or parallel drop wire to poles and buildings. Also available in Type "R" for resistance braid (heavy duty drop wire).

Reliable Drop Wire Clamps are unique in that they:

1. Prolong life of drop wires by permitting free swinging at the support, placing all wear on the hardware.
2. Permit stringing and sagging of service drops before cutting wire.
3. Automatically tighten under load, assuring a firm grip without damaging insulation.
4. Eliminate sharp bends in wire.

"Reliable identifies the quality"

Replace Operator's Batteries with long life

electrox battery eliminator

Type PA-05004

Plugged into your light circuit, the PA-05004 will deliver a constant, humless direct current to the operator's circuit on magneto switchboard. In case of power failure, Power-off Relay automatically transfers operator's circuit to stand-by dry cells.

Other Electrox models are available for Lamp Signal (PBX), and Automatic (PAX) Systems. Capacities of 0.5 to 6 amps, from 12 to 48 volts.

MADE BY THE ELECTROX DIVISION, SCHAUER MACHINE CO.

G–CARLSON FACTORY, GENERAL OFFICES: ROCHESTER 3, N. Y.

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STROMBERG Telephone CARLSON

a condulet and fasten the risers to their respective poles.

On completion of the conduit laying operation, the trench is backfilled and the earth tamped thoroughly in place.

Fishing Wire Through Conduit

ALTHOUGH one-or two-pair lead covered cable may be utilized for the underground conduit installation, it is much more economical and just as satisfactory to use No. 17 parallel drop wire. This wire can be readily pulled through the conduit, particularly if the plastic coated type of drop wire is utilized. It can be easily and cheaply replaced in case of damage by lightning or a power cross. Fish tape or a length of 109 steel line wire may be used for pulling in the wire. A sufficient length of drop wire should be left outside the conduit for connecting

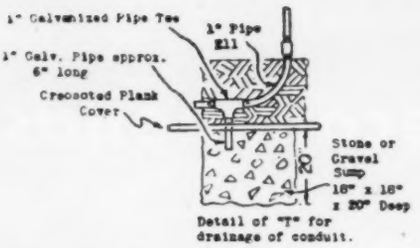
1" Galvanized Pipe Tee
1" Pipe Ell
1" Galv. Pipe approx. 6" long
Creosoted Plank Cover
Stone or Gravel Sump
18" x 18" x 20" Deep
Detail of "T" for drainage of conduit.

Fig. 9.—Construction of sump for drainage from conduit.

to the line wires on each side of the crossing.

Standard type outdoor protectors may be used for the installation. One protector is required for each pair of wires, mounted on one of the crossing poles as shown in Figure 8. Figure 10 illustrates the detail of this arrangement. The protector pole should be the one on which the longer part of the line is terminated. If the crossing divides the line into approximately equal parts, the protector should be installed on the crossing pole farther away from the central office.

Standard protector blocks of the 700-volt breakdown type are utilized in this installation. Fuses are not required in this type of protection.

Protector Pole Installation

ON the protector pole, the drop wire is run in bridle rings from the conduit to the line terminals of the protector. Bridle wires are connected to the same terminals and run in bridle rings to the line wires. These wires are connected to the tails of the dead ended line wires by means of compression or rolled type sleeves. On the other crossing pole, the drop wire is run in bridle rings to their connection with the line as shown in Figure 10.

No. 14 ground wire is connected to the conduit riser near the wire entrance through the condulet as shown in the inset in Figure 7, using

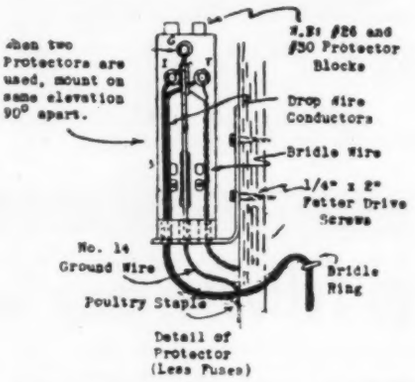
When two Protectors are used, mount on same elevation 90° apart.
K.S. #26 and #50 Protector Blocks
Drop Wire Conductors
Bridle Wire
1/4" x 2" Fetter Drive Screws
No. 14 Ground Wire
Bridle Ring
Poultry Staple
Detail of Protector (Less Fuses)

Fig. 10.—Protector mounting detail.

a standard substation ground clamp. The portion of the conduit on which the clamp is placed should be thoroughly cleaned and brightened before attaching the clamp. After connecting the ground wire to the clamp and conduit should be wrapped with two layers of friction tape to minimize corrosion of the connection. The ground wire is run to the ground terminal of the protector and stapled to the pole with ordinary poultry staples.

Sound Construction Practices

THIS ARTICLE has covered in some detail methods of constructing an overhead or underground railroad crossing. It is hoped that this discussion will encourage the establishment of sound construction practices with respect to wire crossings at railroads, particularly in the case of rural open-wire leads.—THE END.

Table III: Strength Of Head Guys Required For Loading Districts Indicated

Number of Wires	Strength of Head Guys for Ratio of Guy Lead/Height not Less Than—				
	1¼	1	¾	⅔	½
Heavy Loading					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	6,000
10	6,000	6,000	6,000	10,000	10,000
20	10,000	10,000	12,000	16,000	16,000
30	16,000	16,000	20,000	20,000	26,000
40	20,000	20,000	26,000	26,000	32,000
50	20,000	20,000	30,000	32,000	42,000
60	26,000	30,000	36,000	36,000	48,000
70	30,000	30,000	40,000	48,000	60,000
80	36,000	40,000	48,000	60,000	70,000
Medium Loading					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	4,000
10	4,000	4,000	6,000	6,000	6,000
20	6,000	10,000	10,000	10,000	12,000
30	10,000	10,000	12,000	16,000	16,000
40	12,000	16,000	16,000	16,000	20,000
50	16,000	16,000	20,000	20,000	26,000
60	20,000	20,000	26,000	26,000	30,000
70	20,000	20,000	26,000	30,000	36,000
80	26,000	26,000	30,000	32,000	40,000
Light Loading					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	4,000
10	4,000	4,000	4,000	4,000	4,000
20	4,000	6,000	6,000	6,000	10,000
30	6,000	10,000	10,000	10,000	12,000
40	10,000	10,000	10,000	12,000	16,000
50	10,000	10,000	16,000	16,000	20,000
60	12,000	16,000	16,000	16,000	20,000
70	16,000	16,000	20,000	20,000	26,000
80	16,000	20,000	20,000	26,000	30,000

IF
YOU HAVE
MORE
WORK
THAN YOU CAN
DO
WE BRING
THIS MESSAGE
UP TO YOU!

We can help
with tools
and men --
All you need
say -- is --
where and when!

GUSTAV HIRSCH ORGANIZATION Inc.

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Nationally known

"If you could only buy post holes ready-made"

Cheer up— with AMERTEL 135 you can cut out half of your post hole digging

● Poles and post hole digging are an expensive part of telephone line construction. But you can cut these costs in half by using U·S·S Amertel 135. The high tensile strength of Amertel permits you to double the span length in comparison to that used for the old BB wire. This means fewer insulators and less pole-line hardware. Some companies report a savings in total construction costs as high as 30%.

Another plus value you get because of Amertel's high strength is a greater factor of safety. There is less danger from sleet storms and high winds. In addition, Amertel 135 has excellent voice transmission characteristics and low electrical resistance.

To reduce maintenance even farther, many companies are installing PFT Preformed Armor Rods which effectively dampen vibration and protect the conductor at its most vulnerable point—the support.

Write for complete information about U·S·S Amertel 135 and PFT Armor Rods. This combination gives you the best construction at a low cost.

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Birmingham, *Southern Distributors*
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Look for this tag
It is your assurance of highest quality wire.

National and State Association NEWS

A. M. New Reelected Georgia Association President

THE ANNUAL convention of the Georgia Telephone Association, held in Atlanta November 10 and 11, set a new record in attendance and interest when 150 representatives of 53 companies and three service institutions gathered to take part in a balanced and well rounded program.

Reviewing the activities of the Association over the past year President A. M. New, of Thomaston, Georgia, stated that a number of smaller companies were not members of the association and urged each and every member to actively promote greater interest in the association among neighboring non-member companies.

Mr. New then touched upon the great need for more modern and productive rates if the industry is to attract capital with which to meet the heavy demand for improved and expanded service. Denying that our business is any different from that of other industries and service institutions, the speaker quoted several pertinent paragraphs from a recent decision of the Interstate Commerce Commission granting railroads substantial increases in freight and passenger rates. Mr. New further reminded his listeners that this was the second such increase granted within the year bringing the total to nearly 30 per cent over prewar schedules, and producing nearly two billion dollars of additional revenue. Further emphasizing the precarious position of the telephone industry he stated that if toll receipts dropped as much as 20% below current levels most telephone companies in Georgia would soon be in grave financial distress.

In his report as secretary-treasurer, H. M. Stewart, of Cornelia, Georgia, noted that the association had operated within its budget and that eight new members had been added to the roster so far this year. Concern was expressed over the extremely small segment of the business under direct ownership of native Georgians. A more optimistic note was found in the relatively large number of native sons who are stepping into the shoes of their dads. In summarizing the opportunity for constructive effort on the part of the association, Secretary Stewart emphasized the need for better and more uniform tariffs, and for more adequate and reliable accounting, among smaller companies.

Clyde S. Bailey, executive vice president of the United States Independent Telephone Association, offered a penetrating examination of some of the more complex problems now confronting the industry. Apprehensive of the untenable position of an industry caught between the jaws of spiraling costs and fixed income Mr. Bailey prefaced his remarks with the statement that, "most of our problems are dollar problems" which soon would disappear, "if we had the necessary number of dollars."

He then went on to say: "If there is any branch of utility enterprise that keeps its rates on a non-compensa-

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The "busy signal" on a line means a circuit at work... and when you entrust your directory advertising sales to Loomis it is a "business signal" that puts a trained and efficient organization to work for you. Today, Loomis sells advertising in more than 250 directories, consistently increasing revenues and building good will by the intelligent application of almost a quarter-century's experience. Give us the "business signal" that can mean bigger directory revenues for you!

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Gettle Bldg.
FT. WAYNE, INDIANA
KANSAS CITY, MO. ST. LOUIS, MO.
UPPER DARBY (PHILA.), PA. OMAHA, NEBR.

seals the live strength in Taylor-Colquitt Poles

You get stronger poles, with longer life, when you choose Taylor-Colquitt poles. The T-C method of Vapor Drying retains the live strength of the tree. It removes the moisture without checking the fibers—prepares the wood for complete and even distribution of the preservative to the still-living cells and fibers. The result is a longer-lasting pole with greater resistance to decay, and with the live strength sealed in.

Emergency stocks of these new Taylor-Colquitt poles are now available for emergency requirements.

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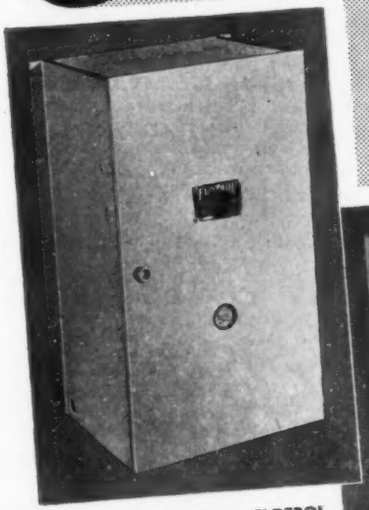
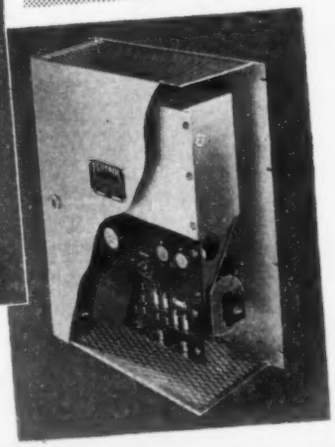
THE AUTOMATIC CONSTANT VOLTAGE BATTERY CHARGER

Without Moving Parts IS ABSOLUTELY DEPENDABLE

as TROUBLE-FREE as SUB-CYCLE



Above illustration shows FLOTROL IN CABINET



Cut-away illustration shows method of cooling Rectifiers without moving parts

DOES EVERYTHING WITH 3 SIMPLE ELEMENTS

DOES NOT USE motors, marginal relays, time delay devices, biased reactors, D.C. stabilizers, reference voltage cells, voltage regulator tubes, or other expendable parts.

FLOTROL IS USED BY TELEPHONE MEN *EVERYWHERE* BECAUSE IT...

- IS ENTIRELY RELIABLE
- IS COMPLETELY AUTOMATIC
- MAINTAINS CONSTANT BATTERY VOLTAGE WITHIN ± 1% UNDER CONDITIONS OF VARYING LOAD AND FLUCTUATIONS IN SUPPLY VOLTAGE
- IS SELF-PROTECTING ON OVERLOADS
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- OPERATES CONTINUOUSLY ON HEAVY LOADS WITHOUT EXCESSIVE HEATING OF RECTIFIERS
- DELIVERS CORRECT TRICKLE CHARGE AT ALL TIMES
- REDUCES POWER CONSUMPTION
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DESIGNERS *and* MANUFACTURERS OF **SUB-CYCLE** • SOLD BY LEADING DISTRIBUTORS

tory basis longer than many of our Independent telephone companies, I don't know what it is. The reason many of our smaller companies are not able to give the kind of service the public expects is that their aggregate revenues are suffering from the lamentable fact that they have had no upward adjustment for 10, 15, 20 and sometimes 25 years—notwithstanding the fact that the price of everything else has gone up, and is still going up."

Zealously pleading that "it is indigenous to the soil of liberty" that the investor supporting the frame work of the telephone company is as worthy of a fair wage as the worker Mr. Bailey manifested confidence that a clear statement of the circumstances involved, backed by essential facts, would receive sympathetic attention from responsible and straight thinking regulatory bodies.

The next speaker, Leon F. Roberts, commercial and public relations representative of Telephone Services, Inc., Chicago, Illinois, urged his hearers to jealously guard the good reputation telephone people have built up over a long period of years. That we do enjoy good reputations is evidenced by such homely acts as leaving the door unlocked for the telephone service man; or calling the office to tell them the key is under the geranium pot.

Taking note of threats to our reputation by delays in meeting an unprecedented demand for service, or by service standards that have suffered from heavily over loaded plant and personnel, the speaker suggested extraordinary caution be taken to prevent further ruptures in the company's reputation, as many years and lots of money and effort may be required to heal them.

J. G. Bradbury, vice president of the Southern Bell Telephone Company, spoke on "Our Mutual Problems". Mr. Bradbury stated that while the Southern Bell served ten times as many telephones in Georgia as the Independents, the Independents serve 4500 more square miles of geographical area. This was graphically illustrated by a map of the state which indicated that 72 counties in the state were served exclusively by Independents, 52 by the Bell company, and 42 counties were served jointly by both branches.

Mr. Bradbury then followed with the statement that "the Independent telephone companies of Georgia are destined to play an important role in the advancement of this great and progressive state of ours for it must be recognied that the availability of adequate and dependable telephone service is certain to effect materially the decisions of people who are contemplating the

With Missouri Association president Chas. Boutin looking on, 25 year veteran Missouri association secretary Bob Hedrick receives gold plaque from Missouri governor Donnelly.

establishment of new industries in the State or the expansion of existing industries."

A. A. Fincher, Jr., of Canton, Georgia, presented an informative review of progress in radio-telephony as reported by the USITA Committee on Radio. Among other things, this report covered possible adaptions and practical application of Radio to telephone service.

The close attention to his remarks, and the generous round of applause that followed them, left no doubt that William F. Corman, of Atmore, Alabama, handled his subject to the full satisfaction of his audience. Speaking on accounting for small companies Mr. Corman stated that accounting is the compass that enables management to chart its course for the future by providing reliable data and information on which it may be based.

Mr. Corman stated that the matter of providing records of property values and operating costs may be deferred but that such neglect is more costly than keeping them up to date. Not only does good accounting pay for itself in providing basic information on which to select a type of new equipment, or from which to project new plant, but it is necessary to prove management's position to the tax collector and regulatory bodies. Furthermore, it is essential when appealing for new capital.

Parenthetically, Mr. Corman stated that he was opposed to tax laws that might discriminate against the telephone industry but that he felt all telephone companies should regard it a patriotic privilege to scrupulously report and pay all taxes due under law; as the taxes drawn from the utilities of the Nation contsitute the very first line of defense against socialistic and un-American ideologies. Pursuing this thought further, Mr. Corman said that

(Please turn to page 62)

STROMBERG-C

subscriber service improves with the

sturgis high-standard

Calm, unruffled subscriber service prevails when operators are mentally and physically well-poised.

The Sturgis No. 635-FF is aptly titled the High-Standard. Its full saddle seat (15¼" by 16¾") is the last word in comfort. Its form-fitting backrest (7" by 13") has the ingenious new Firm-Flex feature, which means that it *gives* to every body movement, furnishing uninterrupted support while the operator turns, bends or leans backward. Three-way adjustment in height and depth provides correct posture for operators of every type of figure.

1" tubular steel, welded throughout, makes the frame indestructible. The hair-filled genuine leather upholstery is equally long-wearing.

Your company, your operators and your subscribers will profit from your selection of Sturgis chairs.

Seat Heights—Adjustable

18" to 22"	24" to 28"
20" to 24"	26" to 30"
22" to 26"	28" to 32"

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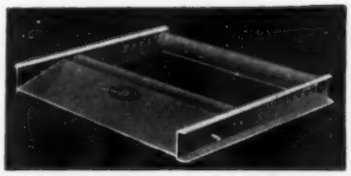
G-CARLSON Recommends

speed *reel-handling with* roll-a-reel

Handling heavy reels of wire, cable, steel strand or rope becomes amazingly easy, economical, and safe with Roll-A-Reel. This essential device saves time and money, both in the warehouse and on the job. Sturdy and simple, with "Tip-Toe" operation, it makes unloading or loading reels as easy as handling a spool of thread.

- Heavy gauge steel frame, capacity up to 2,000 lbs.
- Light-weight and portable; strong ball-bearing rollers.
- Low, slanted front for easy loading and unloading, eliminating use of jacks or other troublesome devices.
- Simple, positive roller lock makes reel removal easy.
- Width 30", depth 28", height 3½", weight 50 lbs.
- Stands upright in any end position for safety, convenience.
- Rear roller can be adjusted immediately for any reel size.
- Built for years of trouble-free service.



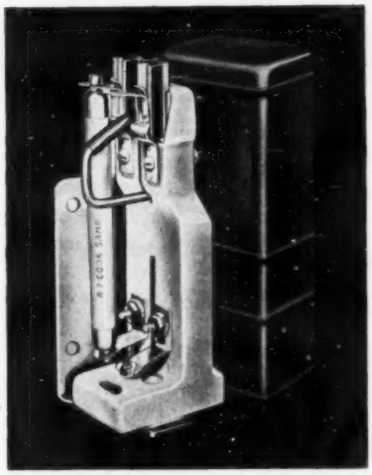
STYLE A—FOR REELS UP TO 28" WIDE

Also available in Style B for 2 reels 24" wide, or one reel 48" wide. Capacity 4,000 lbs.

cook type O *sub-station protector*

This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
2. Tru-Gap high-potential dischargers that will not ground the line.
3. Phosphor bronze fuse and arrester springs, zinc hood, Everdur studs and washers. Hood is grounded when in place.
4. Choice of types and lengths of Cook Telephone Fuses.



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Hemingray No. 42. Standard for many years. Its long leakage path keeps toll lines trouble-free.

Hemingray Insulators have served the telephone and telegraph industry for more than three-quarters of a century.

Proof against every kind of weather and every temperature change, Hemingrays have won universal confidence.

That's why leading telephone and telegraph companies have adopted Hemingrays as *standard equipment.*

These famous insulators are manufactured by Owens-Illinois, Hemingray Division.

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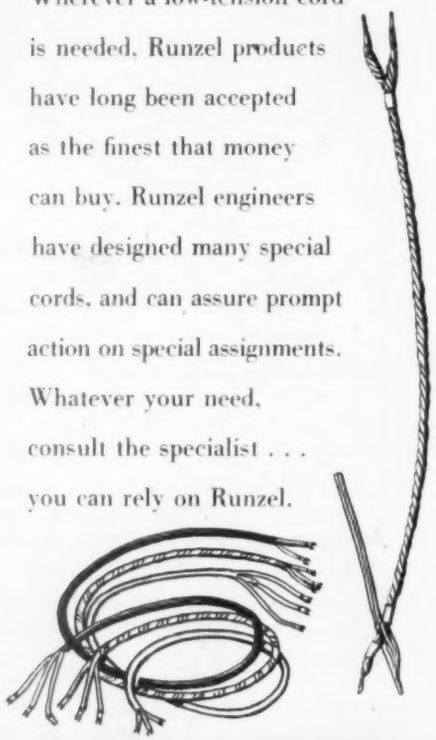
Wherever a low-tension cord is needed, Runzel products have long been accepted as the finest that money can buy. Runzel engineers have designed many special cords, and can assure prompt action on special assignments. Whatever your need, consult the specialist . . . you can rely on Runzel.



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CHICAGO, ILLINOIS

"accounting is to the telephone industry, what the industry is to the United States of America."

Referring to the need for new capital with which to finance improvement and extensions Hon. Walter R. McDonald, chairman of the Georgia Public Service Commission, briefly reviewed the history of money and finance and stated that money had always been available for new ventures in enterprise and that there are huge reserves of uninvested funds now on hand.

Attention was called to 29 billion dollars of deposits and savings now held by the banks of the country. Reference was made to large blocks of new money recently obtained by other utilities in Georgia, most of which was raised within the boundaries of the state. Mr. McDonald stated that a sound system of values of utility property is much more essential to the stock holder than to a regulatory body, since it is the Commission's duty to determine values. Bankers and prospective investors, however, are under no such obligation as that imposed on the Commission. Therefore, management must be armed with records of values and costs when appealing for new money.

Mr. McDonald said the most practical basis of property value for all purposes seems to be the cost at the time it is first devoted to public service. He suggested that the Association might explore the field of rates for rural telephone service in view of bringing them to a more self sustaining level. The speaker is convinced that rural residents are entitled to, and **must** have, good telephone service but that rural service should not continue to be subsidized to a marked degree indefinitely.

W. R. Nabors, consulting engineer of Monroe, Georgia, stressed the urgent need for adequate and consistent tariff provisions in his talk on "Essential Facts Behind Rates and Tariff Administration." In forthright language Mr. Nabors summarized the purpose of tariffs and then outlined the essential subjects to be covered and the steps in which they should be related in tariff structure. Touching upon rates and the current need for rate changes Mr. Nabors offered pregnant suggestions concerning applications for new rates, which were drawn from his experience in preparing rate applications for clients.

W. A. Echols, of Commerce; A. A. Fincher, Jr., of Canton; J. E. Kirk, of Dalton; J. L. Mathews, of Statesboro, and A. M. New of Thomaston were re-elected to succeed themselves on the board of directors. New directors include Ed. P. Burney of LaFayette; W. C. Martin, of Fitzgerald; J. A. Peters, of Manchester; J. H. Wright, of Monroe; H. W. Vaughan, of Chickamauga and C. J. Yates of Atlanta.

A. M. New was elected to succeed himself as president. A. A. Fincher, Jr. was named first Vice President and J. E. Kirk as second Vice President. H. M. Stewart was re-elected Secretary-Treasurer.

♦

F. M. Browne Named Pres. of Missouri Assoc.

F. M. Browne, general mánager of the Western Light & Telephone Company, Kansas City, Missouri, was elected president of the Missouri Telephone Association during the organization's annual convention November 17-18 at

Missouri Association president elect F. M. Browne (right) and retiring president Chas. Boutin.

the Hotel Governor, Jefferson City. Other officers of the association were reelected as follows: Ray Coffman, Cape Girardeau, first vice president; John Leader, St. Louis, second vice president; Earl C. Ewer, Buffalo, third vice president; H. M. Harned, Brentwood, fourth vice president, and R. W. Hedrick, Jefferson City, secretary-treasurer.

J. M. Roberts, president and general manager of the Inter-County Telephone Company, Gallatin, was reelected as a member of the executive committee. W. E. Naylor and B. B. Sproul, both of Kansas City, were named to executive committee vacancies, caused by the retirement of C. A. Vedder, St. Louis, and the elevation of F. M. Browne to the post of association president.

Activities of the first day were highlighted by the presentation of a gold plaque by Missouri's governor Phil M. Donnelly to veteran Missouri association president secretary-treasurer Robert W. Hedrick. A committee headed by Colonel W. C. Gottry, Columbia, Missouri, arranged the presentation in honor of Colonel Hedrick's 25 years' of service to the Missouri In-

Split-Minute Splices

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Nicopress

The Nicopress way cuts wire-splicing time to split minutes. Simply clean the ends of the wire, slip on a Nicopress sleeve and compress with the Nicopress Tool. ***That quick,*** you have a splice that's air-proof, gas-proof and moisture-proof—actually stronger than the wire itself.

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PRESSURE TREATMENTS of Southern Pine Poles, Crossarms, Conduit, Cover Plank, Ground Wire Moulding with No. 1 Creosote Oil or Pentachlorphenol are carried in stock permitting prompt shipments of carload and less than carload orders. Mailing address: P. O. Station "A", Atlanta, Ga.

WILLIAM C. MEREDITH COMPANY, Inc.

Treating Plant: East Point, Ga. — Mailing Address: P. O. Station "A", Atlanta, Ga.

WHY You Should Specify "PENTA" PRESERVATIVE TREATMENT...

for your poles, cross-arms and other exposed wood

1. Chapman "Penta" Preservative is *clean*—not sticky or unpleasant for linemen and other workers. In fact, with proper choice of solvent carrier, it is possible to treat wood thoroughly with "Penta" Preservative and have it virtually the same in appearance and feel as untreated wood.

2. Ten year tests prove that Chapman "Penta" Preservative gives you superior protection against rot, termites and other enemies of wood. No other material commercially available today can do a better job.

3. Chapman "Penta" Preservative costs no more than familiar materials, and treatment is applied with the same equipment and in substantially the same way as old-fashioned preservatives. That means you can buy treated poles and cross-arms—or have your own material properly treated—in any part of the U.S.

Write us for details and evidence to confirm the statements made above.

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Chapman "Penta" Preservative contains *Pentachlorphenol*
a product of
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dependents. The association also presented Colonel Hedrick with two easy chairs for his home, and honored Miss Katharine Bauer, assistant secretary for many years, with a gift of war Bonds which were also presented by Governor Donnelly.

Foster B. McHenry, Jefferson City, representing the United States Independent Telephone Association in the opening address reviewed the present position of the Independent companies and stated that the territory now served by Independent telephone companies is estimated at approximately 70 per cent of the total area of the United States.

Referring to the activities of the United States Independent Telephone Association, Mr. McHenry stated that "a great deal of the time of the association is spent in studying the problems of the smaller companies who are financially unable to employ technical assistance."

Charles W. Boutin, president of the Missouri association and president of the Southeast Missouri Telephone Company, Cape Girardeau, presented Governor Donnelly, who officially welcomed the group of more than 265 Independents to the convention city. Mr. Boutin also aided in the presentations to Colonel Hedrick and Miss Bauer.

Other speakers appearing during the two day meeting were: Dr. A. C. Magill, head of the Department of Chemistry, Southeast Missouri State College, Cape Girardeau; Ray W. Smith, editor of Telephone Engineer Publications; Henry Altpeter, district plant superintendent of the Southwestern Bell Telephone Company, Van Murchie, St. Joseph, Missouri.

A traffic conference and operators' meeting was held on the second day of the convention under the supervision of Miss Margaret Powell, traveling chief operator, Southeast Missouri Telephone Co., Cape Girardeau.

The Theodore Gary Chapter of the Independent Telephone Pioneer Association held a business and luncheon meeting on November 18. Officers elected were: Mrs. J. T. Willis, Harrisonville, president; T. L. Leonard, St. Louis, vice president; Miss Katharine Bauer, secretary-treasurer. Directors elected were: R. R. Coffman, Lawson; J. G. Kraemer, Kansas City, and Richard Sullins, Madison.

◆

James Blades Named President Of North Carolina Association

J. E. Blades of the Norfolk & Carolina Telephone Company, Elizabeth City, North Carolina, was elected president of the North Carolina Independ-

(Please turn to page 67)

You Get Double Protection with...

"BLACK BEAUTY" POLES

PRODUCT OF TEXAS CREOSOTING COMPANY

Black Beauty poles are doubly armored—against injury by storm and damage from decay. The Texas "empty-cell" method of moisture extraction insures complete impregnation with the strength-giving preservatives that fortify "Black Beauty" poles against every form of nature's attacks. Specify "Black Beauty" for double protection, the next time you order poles.

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INVEST YOUR "PIN MONEY" IN THE BEST

LOCUST PINS

Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

OAK BRACKETS

Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

GLASS INSULATORS

Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

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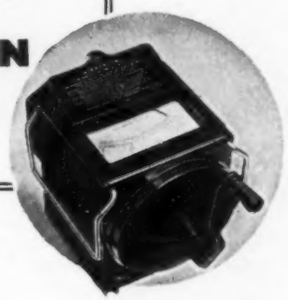

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Whether in central office or out on the system, your "Megger" Insulation Tester is an unfailing detector of weakened insulation.

Simply turn the hand crank to generate 500 volts D.C. Read insulation resistance by pointer deflection. Always ready for use any time . . . anywhere . . . the new U. S. model in rugged plastic case weighs but 8 pounds. Telephone model has guard terminal and capacitance discharge switch. Write for Bulletin 1735-TE—today.

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ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

Management Present and Future

(*Continued from page* 34)

points to the fact that the reason more Independent exchanges have not made higher rates effective is not that the commissions have refused to allow them higher rates in justifiable cases. It is principally because the bulk of Independent companies have not applied for higher rates.

The fact is that the utility commissions themselves are evidencing some alarm over this situation. They know that proper telephone service cannot be supplied by telephone companies with inadequate income. They know the economic facts of life about the heavy increase of costs and expenses of supplying telephone service, that have come about during the past several years.

They are inclined now, probably more than ever before, to give prompt and sympathetic attention to applications of Independent telephone companies—particularly the smaller companies—for rates inadequate to meet the present high level of expense.

Prices On the Rise Since 1940

SINCE 1940 THERE has been a gradually accelerating rise in prices and the cost of things, both goods and services, in this country. Economists now say that prices have risen generally about 50%. It is probable that the increase is not yet quite that high in small towns—but it is also fairly certain that even they will feel the same country-wide percentage of increase in time.

In hundreds, perhaps thousands, of small telephone exchanges, the only answer to higher wages and other increased costs of supplying telephone service is higher rates. The situation is apparently that less than one-tenth of the Independent exchanges have applied for an adjustment of rates adequate to meet the much higher costs of providing the service they supply. We say frankly that we think this is a dangerous situation for the Independent telephone industry, and one which may have serious financial consequences to many Independent companies; particularly, many small companies.

A writer on the subject of rates for small telephone exchanges said recently: "To achieve . . . prosperity it will be necessary for the small unit of the industry to have good and well-kept plants, to supply good telephone service, to be in position to extend this service to meet the telephonic demands and needs of its operating territory, to be adequately financed, and to have rates for its service which will allow it, after all expense, a fair return.

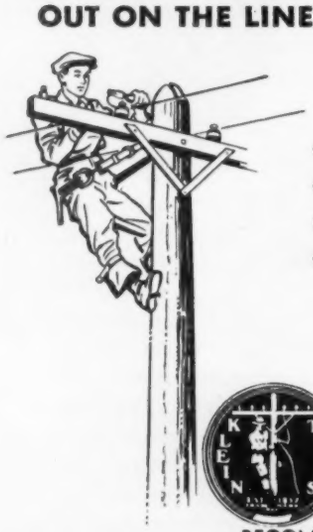
"In many companies the starting point to most, if not all, of these things is adequate rates; no amount of efficiency of management can overcome inadequate revenues."

That, I think, tells the story. The recipe for the prosperity of the telephone exchange is good plant, good service, good rates. The key to all of that is good—i.e., adequate—rates. These things are all matters of management. The "what's next" for most telephone companies will be what the management of those companies make it.

The ingenuity, resourcefulness, individuality and hard work of Independent telephone managements have made the Independent telephone industry the factor in telephony that it is today. Those same elements can and I think will keep the industry important.—THE END

Count on KLEIN

OUT ON THE LINE



- Pliers and cutters
- Climbers and Belts
- Wire Grips
- Tool Bags

IN THE EXCHANGE

Klein Tools are work savers that aid your men to do better work . . . put jobs through faster . . . guard their safety. Easy on the budget, these quality tools cut down on tool expenses. The name "Klein" has stood for tops in quality and the finest in tools, ever since 1857. When you're buying new tools, be sure you get Klein.

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AUTOMATIC ELECTRIC SALES CORPORATION

1033 W. Van Buren St. Chicago 7, Ill.

North Carolina Convention

(Concluded from page 64)

ent Telephone Association during the group's annual convention at Southern Pines, November 20-21. Other officers elected were R. S. DuRant, Marion, vice president; R. E. Kepler, Durham,

Photographed during North Carolina Convention: (right to left) A. E. Reynolds, Kelley McNish and George Thompson.

vice president; Louis Runkle, Asheboro, vice president, and L. R. Raby, secretary-treasurer.

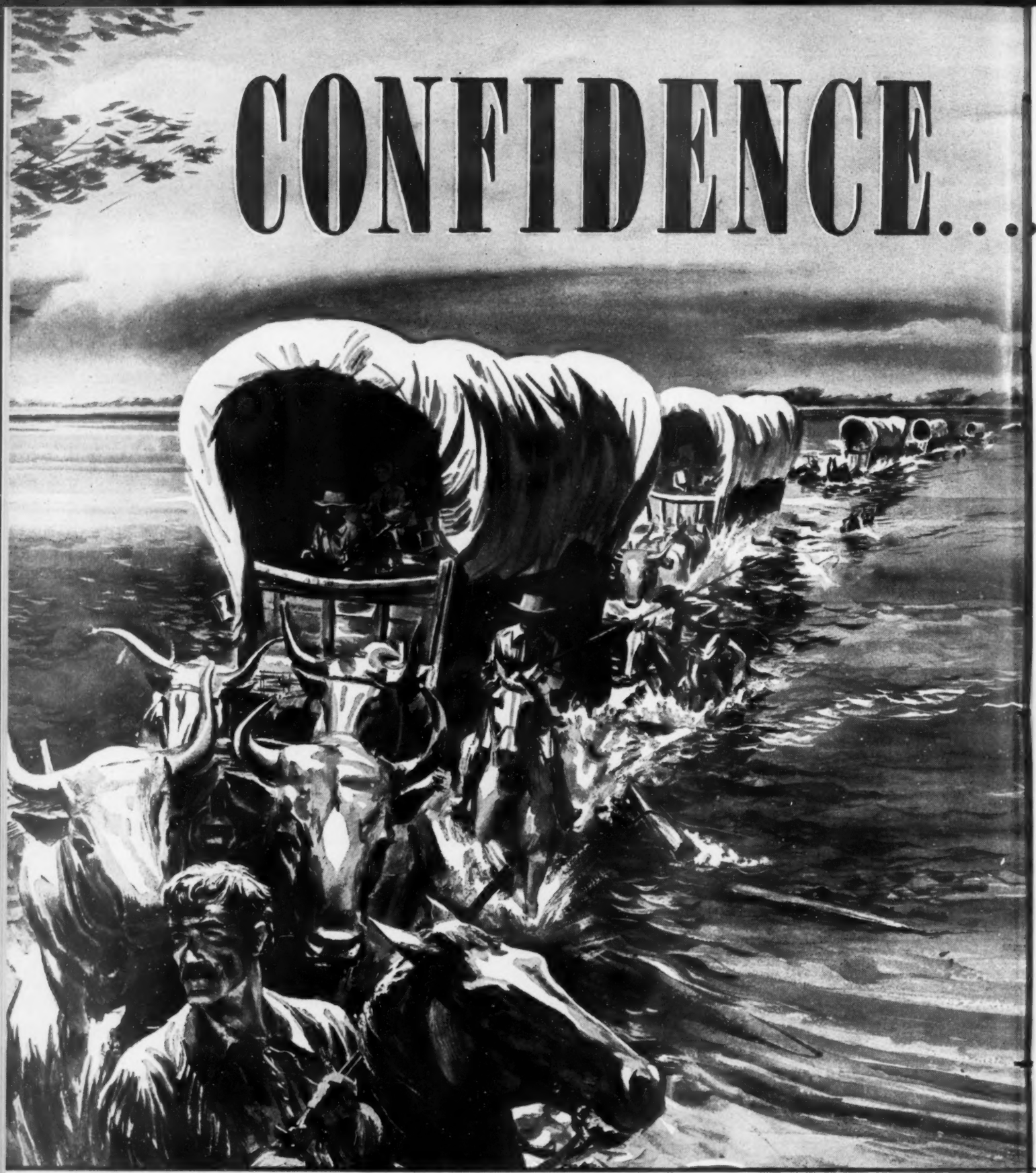
Mr. Blades succeeded E. W. Olschner, Tarboro, as president. Mr. Olschner became an ex-officio member of the board of directors for a one-year term. Other directors named for one year terms were: Douglas Carpenter, Hickory Telephone Company, Hickory; L. D. Coltrane, Jr., Concord Telephone Company, Concord; Jack Havens, Carolina Telephone & Telegraph Company, Tarboro; Frank LaPrade, Lee Telephone Company, Martinsville, and R. E. McKelvey, Western Carolina Telephone Company, Franklin.

Two Year Term: John Cline, Central Carolina Telephone Company, Southern Pines; R. S. DuRant, Carolina Mountain Telephone Company, Marion; W. C. Harris, Lexington Telephone Company, Lexington; E. C. Heins, Jr., Heins Telephone Company, Sanford, and J. H. Snider, Denton Telephone Company, Denton.

Three Year Term: James Evans Blades, Norfolk & Carolina Telephone & Telegraph Company, Elizabeth City; L. D. Densmore, Virginia Telephone & Telegraph Company, Charlottesville; E. O. Freeman, Sandhill Telephone Company, Aberdeen; R. M. Tucker, North State Telephone Company, High Point, and Ralph Van Trine, Durham Telephone Company, Durham.

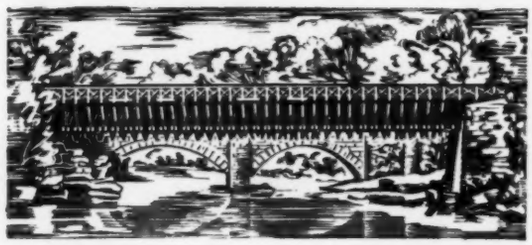
The two-day program featured many outstanding telephone industry leaders.

KLEIN PLIERS!
. . . PREFERRED BY LINEMEN
Wherever there are linemen . . . whatever the job—tough or routine—you'll find Klein Pliers.
There's good reason for this widespread preference that began when the electrical industry was in its infancy and has continued on through the years.
Linemen know they can depend upon the quality and performance of Klein Pliers. Drop forged from the finest alloy steel, each pair is individually tempered and tested—has the proper balance—just the right spring to the handles to minimize hand fatigue. A fitted hinge keeps jaws perfectly aligned—the carefully matched knives cut swiftly, surely and stay keen for years.
The complete Klein line includes pliers for every use. Your supplier will fill your order as quickly as possible.
Ask Your Supplier
Foreign Distributor: International Standard Electric Corp., New York
A copy of the Klein Pocket Tool Guide, showing the Klein line and containing valuable tool information, will be sent on request.
Since 1857
KLEIN TOOLS
Mathias Established 1857 KLEIN & Sons Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

.....how much is it worth?



IN 1844, three years before Alexander Graham Bell was born, and long before the first Prairie-Schooner crossed the Mississippi River, John August Roebling's confidence in the suspension principle of construction so impressed the engineers of the State of Pennsylvania, that they authorized him to build the world's first suspension aqueduct.

How much is his confidence worth to all the thousands of engineers who followed and to humanity in general that have benefited from his pioneering venture?

And how much is the confidence of the John A. Roebling's Sons Company in the future of American industry worth to you, that keeps Roebling development and Roebling products in the lead?

Roebling's greatest asset is your confidence in Roebling and its confidence in your future. That is why Roebling's every effort is dedicated to the preservation of this confidence—your's and Roebling's.

CONFIDENCE IN ROEBLING . . . CONFIDENCE IN KELLOGG!

ROEBLING TELEPHONE CABLE is sold through Kellogg Switchboard and Supply Company for just one reason. We, here at Roebling, know that the Kellogg Company can offer you the finest telephone cable planning and engineering service available. We have the same confidence in Kellogg that we have in our product.

Through Kellogg you can buy Roebling Lead Encased Telephone Cable. It can be supplied with conductors of No. 19, No. 22 and No. 24 A.W.G. in sizes ranging from 5 pairs to 900 pairs.

Each conductor is paper insulated . . . each pair is color coded. Cabled together, they are paper taped and treated under controlled temperature and vacuum to remove moisture. Ordinarily the cable is sheathed with lead containing 1% antimony.

When the cable is to be used for direct burial, there can be added a jute protection against soil corrosion. For high mechanical protection, steel tape armor can be furnished.

Here is a typical example of a product of Roebling quality. For its most efficient use, contact Kellogg Switchboard & Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

Roundtable LINE and DESK Discussions

Edited By
J. S. REED, JR.

Q. We propose to attach a cable to a bridge across a river. What is the proper procedure to follow in such a case?

A. Permission must be obtained from the state highway department or other governing body before attaching the cable to the bridge. No attempt should be made to remove bolts or rivets from the bridge for the purpose of attaching the cable. A safe method of fastening the cable to the bridge is to utilize clamps made from sections of crossarms and attached to the bridge trusses with crossarm bolts. The cable is attached to the outer part of the wood clamps by means of suspension clamps. Usually the wood clamps are arranged to prevent metallic connection of the cable with the bridge structure, particularly when power wires are carried on the bridge. The clamps also help to retard transmission of vibration of the bridge structure to the cable.

◆

Q. What is the reason for using armor ties or tie wire splints in certain types of open-wire lines?

A. Armor ties are required to reduce damage to the line wires at insulator ties as the result of vibration. Excessive vibration will crystallize the wires at the insulator ties and cause them to fail eventually. Vibration occurs in areas of steady low-velocity winds, such as in the Middle West. At velocities of ten miles per hour or less, eddies are formed on the leeward side of the wire. These eddies jump up and down from the top to the bottom of the wire at a periodic rate. If the natural period of vibration corresponds to this periodic rate, the wire will vibrate. This effect is especially noticeable in long wire spans. The armor tie or tie wire splint keeps the line wire away from contact with the insulator and, at the same time, absorbs the vibration to some extent. The use of the special ties is necessary only in long span construction and in important heavy copper wire leads where trouble has been experienced with tie wire "burns."

◆

Q. Would you recommend the use of collapsible tool buckets in our construction work?

A. We do recommend the use of collapsible tool buckets because they promote safety. A man on top of a pole when he is provided with a bucket in which to place these items, will not throw tools or materials to the ground, thus reducing the danger of accidents to other men working on the ground.

◆

Q. What is the reason for grounding cable sheath?

A. The purpose of grounding cable sheath is to protect the cable in case of a cross with the power wires, or in case of lightning strikes the cable. The tendency is for the power wire to burn a hole in the sheath. If the cable sheath is not grounded, the foreign current will flow through the cable conductors to find ground and cause considerable damage in the process. The sheath of the cable should be grounded at the point where it terminates in a central office. It may be necessary, however, to install insulated splices in the cable, as when electrolysis must be prevented.

◆

Q. Is gas pressure testing of cables an expensive method?

A. Gas pressure testing can be relatively inexpensive because only a few tools are required. Usually all that is required is a 24 cubic foot oil-pumped nitrogen gas container, a pressure testing clamp, a short length of rubber hose with clamp-on connectors, and a small awl for puncturing the cable sleeve. The container should be equipped with a regulator for adjusting the pressure of the gas supply to the cable. The pressure should not exceed 20 pounds per square inch.

The testing method is as follows: Punch a small hole in the cable sleeve, near one end where there is air space inside the sleeve. Attach the pressure testing clamp over the hole in the sleeve and connect the hose from the regulator on the gas container to the clamp. Turn on the regulator valve to obtain about 10 pounds pressure. Then apply soap suds over the cable sleeve and cable sheath. The presence of bubbles will indicate leaks through the cable sheath or wiped joints. Often it is possible to detect leaks by the sound made by the escaping gas. The hole originally made in the sleeve is afterwards sealed with solder.

This method can be used for the following situations: flash testing of cable sleeves after wiping, testing cable in case of trouble due to moisture entering the cable, driving the moisture out of cable, and construction of cable extensions or new cable plant.

The container may be refilled as required from a standard 200-cubic foot cylinder of oil-pumped nitrogen gas.

Free Help on Problems

IF YOU DON'T see a ready answer to your questions, let TELEPHONE ENGINEER'S staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply.

"I've always been a part of your telephone service"

"You'll find my name on your Bell telephone—you see it on reels of cable being fed into manholes or strung on poles—you'll find it, too, on the complex equipment in your telephone exchange.

"As the supply member of the Bell Telephone team, I manufacture equipment, purchase supplies, distribute both to the telephone companies, and install central office equipment.

"Year in, year out, I help my Bell Telephone teammates to give you the world's *best* telephone service at the *lowest possible cost.*

"Remember my name—it's Western Electric."

MANUFACTURER... of 43,000 varieties of telephone apparatus.

PURCHASER... of supplies of all kinds for telephone companies.

DISTRIBUTOR... of telephone apparatus and supplies.

INSTALLER... of telephone central office equipment.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

NO WIRE CUTTING

WITH THE NEW **Hemingray**

TRANSPOSITION INSULATOR

These new Hemingray No. 56 Insulators were designed especially for "point-type" transpositions on standard tandem and four-pin brackets. Retranspositions are made without cutting wires by simply "rolling in" the old lines. Extra-deep grooves eliminate need for tie wires.

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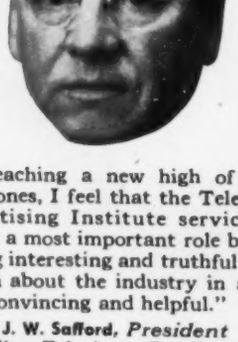

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Troy-Tipp Telephone Co., Troy, Ohio

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DROP WIRE

TWISTED PAIR and PARALLEL in NEOPRENE

Manufactured to exacting specifications, utilizing advanced techniques and modern equipment under positive laboratory control.

Distributed by
KELLOGG SWITCHBOARD AND SUPPLY CO.

GENERAL INSULATED WIRE WORKS, INC.
PROVIDENCE, RHODE ISLAND

Automatic Director Network

(*Continued from page* 51)

where there are no Directors are simpler—only two classifications, unlimited and local, are provided for by the well known methods used in standard private automatic branch exchanges.)

Those of the operating personnel who are constantly located in the same district and who have occasion to call only those stations that are served from their own telephone office are encouraged to call such stations by dialing only the last three digits of the five-digit directory number. Such a call by-passes the Directors, thereby leaving them available for inter-office calls. When only the last three digits are dialed, the call is routed to the connector switches direct from the banks of the local first selector switches. It should be noted, however, that only local telephone calls, originated and terminated in the same office, can be completed by dialing this abbreviated number.

The chief functions of the Director in this network are to assist in the extension of the call to its final destination and to test the line on which the call is being originated for the classification of service to which that line is entitled. After it has accomplished these functions the Director is released. Since the Director is actually in use only in the originating office during the process of establishing a call, only a few Directors are needed in each office.

The Director used for this installation is shown in Figure 4 which gives an idea of the simplicity of this "electrical robot". It is recognized, however, that its need for faultless operation is paramount. The operation of any of the Directors can be placed under instant surveillance by its almost human operation analyzer. By the simple process of manipulating a key or a dial the entire operation of the Director is displayed on a small instrument panel. This panel will show by means of lamps the number of pulses transmitted and by means of a meter their speed and quality. No skilled technician is required to analyze the operation of the Director; just operate a key or turn a dial and the entire operation is displayed on a compact panel permanently associat-

ed with each group. The six offices range in size from 200 to 400 lines each. The automatic switching equipment in each office, except for the Directors, is very much the same as in any other step-by-step office. It consists of line equipment, selector switches and connector switches, the latter including both the regular individual line type and the P-B-X (trunk hunting) type. Some of the offices also include a group of novel party line connectors to serve temporary field lines during the preliminary construction work in a new district.

Conclusion

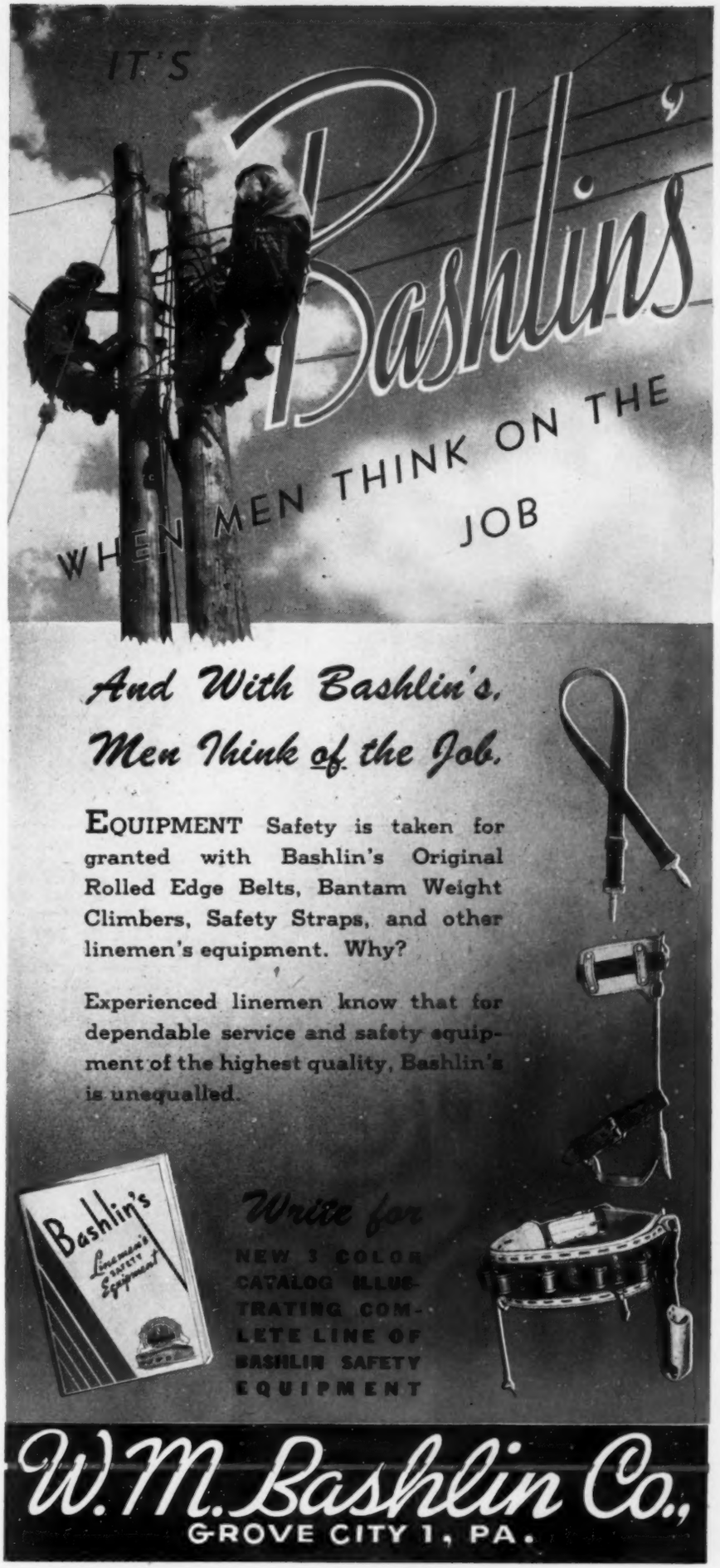
IT WILL BE seen from the foregoing that this network is a novel one in many ways. Telephone calls may be dialed over the entire area without the aid of a telephone operator in any of the six offices. An outlet to the commercial telephone company is afforded from a P-B-X connector group in one of the offices. Information service is provided by the local telephone plant department of the combined oil company enterprise. All six of the offices are designed for unattended operation. Any irregularity of the operation of the automatic telephone equipment is automatically transmitted to a designated individual in each of the offices. This person can, by dialing certain test numbers, determine the nature of the irregularity to ascertain whether it requires immediate attention or can be deferred until later.

This installation may be compared to a minature city telephone network. The principal distinguishing feature is that in a city network the various offices, besides being larger, would be in a comparatively compact area with direct trunks between most of the offices. In this system the offices are widely separated with most of the offices connected in tandem. Thus, the network is truly a preview of what the Director can accomplish in a commercial telephone toll network with extensive tandem trunking.—THE END.

◆

New Telephone System Installed In Paris

The Western-Arkansas Telephone Co. recently completed replacement of the Paris magneto system with a common battery system according to Gus Lane, head of the Western Arkansas company.


IT'S
Bashlins
WHEN MEN THINK ON THE JOB
And With Bashlin's, Men Think of the Job.
EQUIPMENT Safety is taken for granted with Bashlin's Original Rolled Edge Belts, Bantam Weight Climbers, Safety Straps, and other linemen's equipment. Why?
Experienced linemen know that for dependable service and safety equipment of the highest quality, Bashlin's is unequalled.
Bashlin's Lineman's Safety Equipment
Write for
NEW 3 COLOR CATALOG ILLUSTRATING COMPLETE LINE OF BASHLIN SAFETY EQUIPMENT
W. M. Bashlin Co.,
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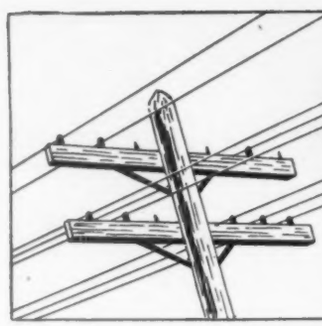
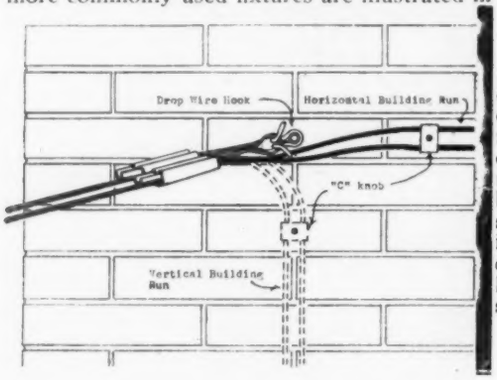


TELEPHONE ENGINEER Handbook Tables

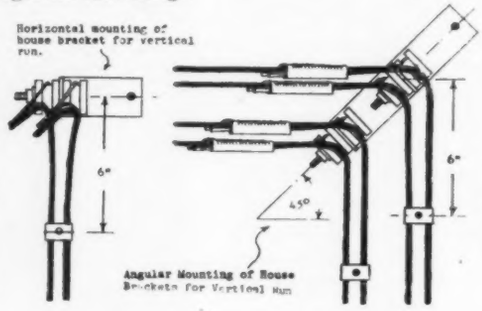
Index: Drop Wire Installation
Date: December 15, 1947

Subject: Methods of Attaching Drop Wire Spans to Buildings

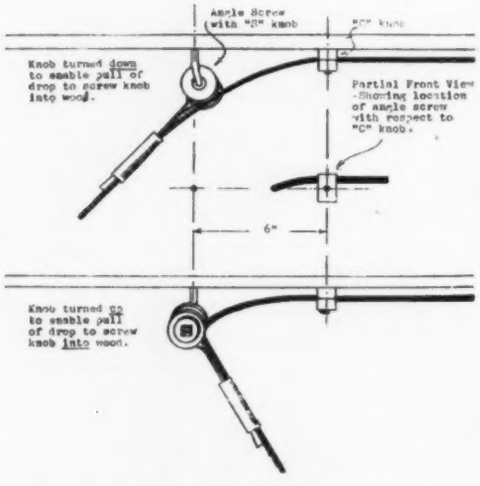
Table No. 1—Types of drop fixtures and fasteners used for attaching the fixtures (May 15, 1947 Telephone Engineer and Management) listed types of fixtures for attaching drop wire spans to buildings. Methods of installing the more commonly used fixtures are illustrated in the series of diagrams following:



Attaching one or two drop wires for vertical or horizontal run on solid brick or stone building, using drop wire hook or masonry hook.

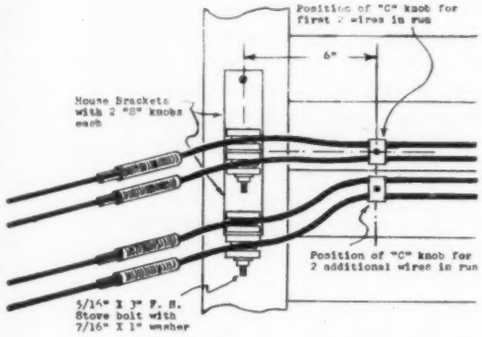


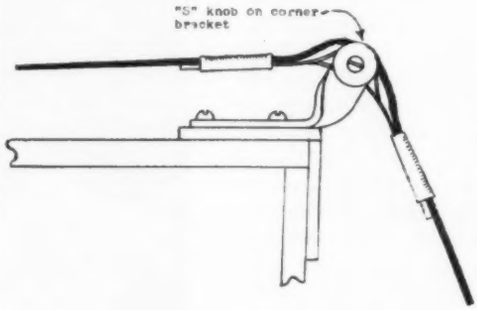
Attaching 3 or 4 drop wires for vertical run on building, using house brackets with "S" knobs.


Angle Screw (with "S" knob
"C" knob
Knob turned down to enable pull of drop to screw knob into wood.
Partial Front View -Showing location of angle screw with respect to "C" knob.
6"
Knob turned up to enable pull of drop to screw knob into wood.

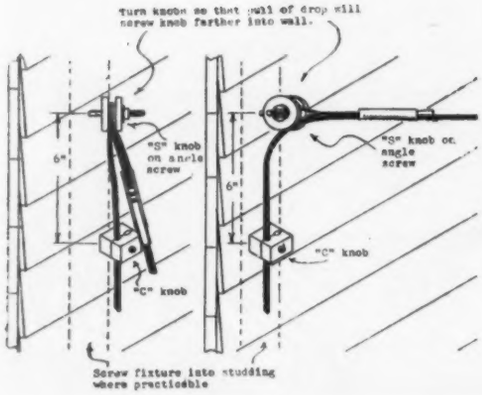
Attaching drop wire for horizontal run on building, using angle screw with "S" knob.

Attaching 3 or 4 drop wires for horizontal run on building, using house brackets with "S" knobs. (Note: This arrangement may be used for one or more drop wires on brick or stone veneer buildings.)


Position of "C" knob for first 2 wires in run
6"
House Brackets with 2 "S" knobs each
Position of "C" knob for 2 additional wires in run
5/16" X 3" F. H. Stove bolt with 7/16" X 1" washer

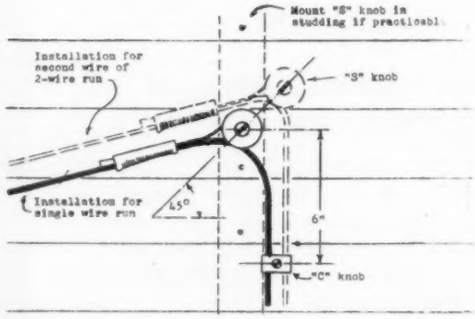


Attaching drop wire for horizontal run to pass around corner of building, using corner bracket with "S" knob.


Turn knobs so that pull of drop will screw knob farther into wall.
"S" knob on angle screw
6"
"S" knob on angle screw
6"
"C" knob
"C" knob
Screw fixture into studding where practicable

Attaching drop wire for vertica run on building, using angle screw with "S' knob.

Attaching one or two drop wires for vertical run on building, using "S" knob.



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World-wide acceptance of products bearing this trademark has been insured by a half-century of manufacturing experience and skilled craftsmanship. This "know-how" assures the ability of Automatique Electrique to meet the demands of every public service organization.

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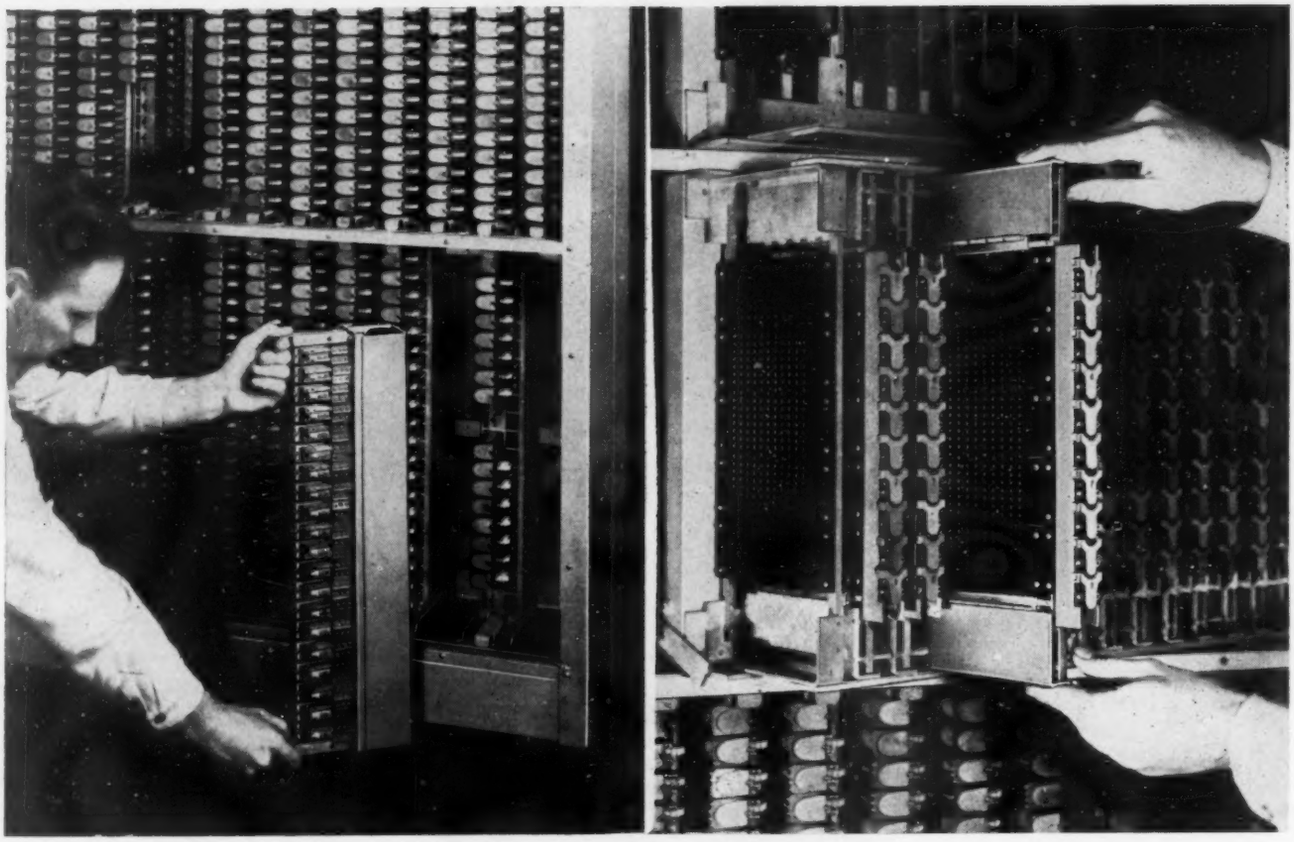


Left: Jacking-in a 10 line relay group adds 10 lines to the Leich dial switchboard. Right: Finders and connectors are easily jacked-in on new Leich dial switchboard.

The NEW LEICH Dial System

PREVIEW of new Leich dial system shows unit combines flexibility for making quick, inexpensive additions or changes.

THE LEICH DIAL SYSTEM, a new development in the dial switchboard field, was first shown to the Independent industry at the recent convention of the United States Independent Telephone Association in Chicago.

Leich has spent seven years in the design and development of the equipment. A trial switchboard has been in actual operation for two years at Cherry Valley, Illinois. This installation made it possible to observe the board in everyday service, with the result that many little improvements and refinements were made before the equipment was introduced to the industry.

According to Leich, the new dial switchboard is more simple in design and operation than other types of dial switchboards. The primary objectives in its development were to produce a dial system that would be easier to understand and less expensive to operate. This, it was felt, would be of particular benefit to the smaller companies that wanted to convert to dial but were not sure of their ability to maintain the equipment involved.

Flexibility For Making Quick Additions

THE NEW LEICH switchboard is claimed to combine flexibility for making quick, inexpensive additions or changes, with dependable performance that requires no highly skilled help for maintenance.

Lines can be added to the Leich Dial Switchboard in groups of 10 by simply jacking-in a line-relay bar which contains the relays for 10 additional lines. This can be done in a matter of minutes.

Links are added almost as easily, and no factory installer is needed. It takes less than an hour to add a link.

No soldering is necessary in adding lines or links. All the connections in the multiple are made by flat stainless steel bars. These bars slide into place through Bakelite guide blocks and connect the finder and connector switches to all the lines in the multiple. These corrosion-proof connecting bars eliminate many thousands of soldered connections. They also prevent the possibility of opens or transposed wires in the multiple.

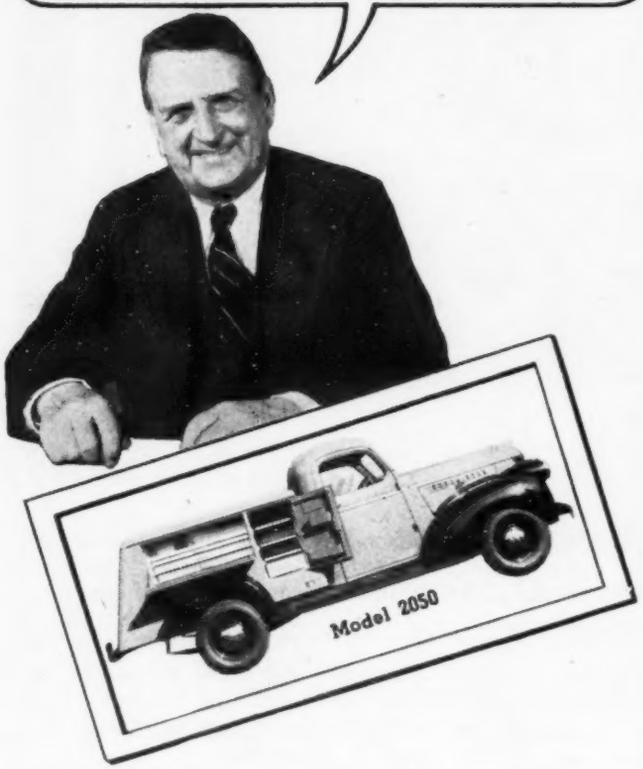
To add a link, the connector bars are slid out, a finder and connector switch are jacked in and the bars are pushed back. Jacking-in a control relay bar completes the installation.

It is suggested by Leich that because

(Please turn to page 78)

Tops in Operating Efficiency!

That's right! The operating efficiency of YORK-HOOVER BODIES is tops because convenience, accessibility and long life are built into each unit, from the largest to the smallest.



For over fifty-five years, ever growing experience plus top quality materials and fine craftsmanship have been the basic factors contributing to the reliable performance of York-Hoover Bodies . . . factors, too, that have earned and maintained the valued confidence of our customers.

YORK-HOOVER BODY DIVISION CORPORATION
YORK, PENNSYLVANIA

JUST INTRODUCED A FEW SHORT MONTHS AGO . . .

THOUSANDS NOW IN USE!

TURNER *Low Pressure* FIRE POT

WITH EXCLUSIVE
"Carburetor Control"
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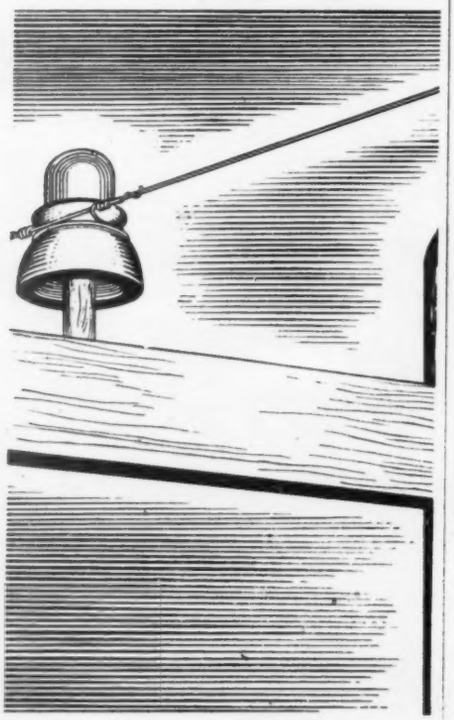


★ 1847 ★

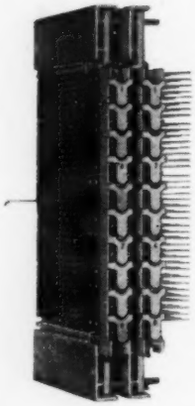
Cornell's inverted cup insulator

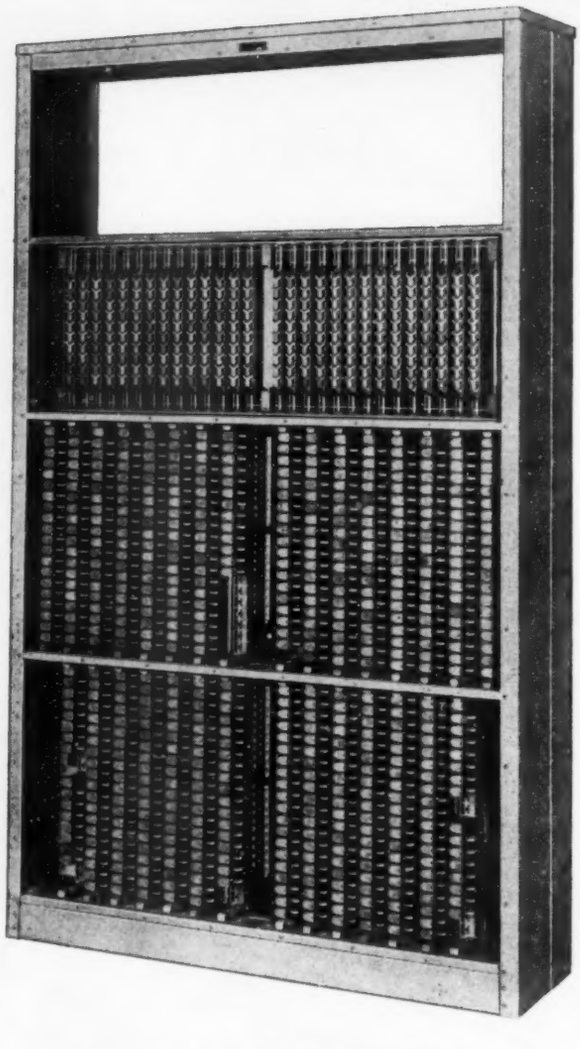
FORERUNNER of modern insulators was invented by Ezra Cornell. He used an inverted glass cup or "umbrella" mounted on a vertical pin. The overhanging flange shed water and kept the underside relatively dry.

The manufacture of Hemingray insulators has evolved since 1848 from a hand process to the use of fully automatic machines for carefully controlled production.

Write for the complete historical outline of insulator development.

HEMINGRAY INSULATORS
Owens-Illinois Glass Company
Hemingray Division, Muncie, Ind.





Above: Stainless steel bars are used to connect all the lines in the multiple to the finder and connector switches. These bars eliminate thousands of soldered connections in the multiple on the Leich dial system.

Right: New 100-line Leich dial system.

these parts are all jacked-in, the local maintenance man can, if he prefers, jack-in spare parts and send any parts in trouble to the factory for repair.

The new Leich Dial Switchboard has no mechanical motions exceeding that of a relay armature. Factory tests of the switches were made in which they withstood ten million operations without adjustment, replacement or noticeable wear. The Leich engineers attribute this long life (equal to 25 years service) to the simplicity of design and the absence of mechanical motion.

Because all of the apparatus jacks-in on the framework and because thousands of soldered joints are eliminated, a 100 line Leich Dial Switchboard can be installed in about one week.

The Leich Dial System is built in standard 100-line units. They may be equipped with from 20 to 100 lines and from two to 14 links. There is room in the original 100 line frame for interconnecting equipment to add another 100 line unit. In this way, a 100 line unit can be expanded to 400 lines without the use of selectors.

Each 100-line unit is only 50" wide by 83" high by 14" deep. 200-lines require two units; 300 lines three units; 400 lines, four units. There is no back-to-back arrangement of equipment.

A new relay has been developed for use on the Leich dial system. The make and break springs on this relay are preformed to give correct contact pressure, and provide a fixed, built-in adjustment.

The doors are of Plexiglass, a transparent plastic, permitting observation of the board in operation without opening the doors. These doors are of the sliding type, which is convenient if there is little working space around the switchboard.

According to Leich, this board should prove very economical to operate. The reasons are: Dependable service with little or no routine maintenance required; no specially trained help necessary; jack-in apparatus throughout, including lines, links and switches; ample trunking; ease and speed of expansion; small floor space required.

A new 16 page, two-color catalog is now available which describes this new dial system in full detail. Copies may be had by writing Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois.

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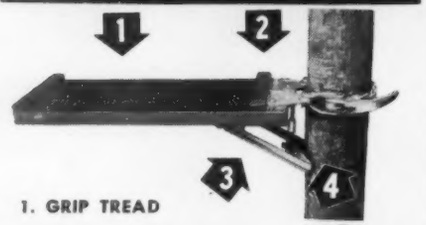

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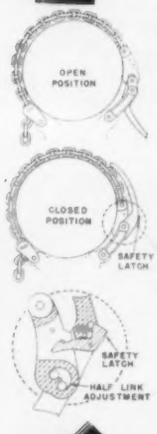

The Chance Utility platform reduces fatigue for linemen doing prolonged repair jobs in confined areas. It is light in weight with fittings cast of heat-treated aluminum alloy and is easily attached with a new type lever chain tightener that locks automatically and cannot be accidentally released.

The platform surface is coated with a plastic grip tread that will not crack, chip or peel off. Brace may be folded flat for easy transportation. Working load 500 pounds.

C4729

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Improvement Program For Villisca, Iowa

An additional section has been added to the switchboard in the office of the Villisca Iowa Farmers Mutual Telephone Company which will accommodate 15 additional telephone lines and otherwise increase the efficiency of the service. The company now has in operation 300 city lines, 52 rural and six commercial lines.

Other changes contemplated by the company include the repair of three rural lines in the Villisca vicinity as well as the installation of a toll system between Villisca and Clarinda, thus giving a more direct service.

◆

Gary Group Michigan Co's Announce Changes

Announcement has been made by B.C. Schweitzer, president and general manager of Union Telephone Company and Tri-County Telephone Company, Michigan operating companies of the Gary Group, of the appointment of J. F. Van de Vusse as assistant general manager of both companies. Mr. Van de Vusse, who comes from Fort Wayne, Indiana, will make his headquarters at Owosso, Michigan, and succeeds E.R. Vaughan, who recently resigned to enter the automobile business in South Haven.

J. F. Van de Vusse

A native of Michigan, Mr. Van de Vusse joined the commercial department of Tri-County Telephone Company at South Haven in 1930, remaining there 13 years. In 1943, he went to Fort Wayne as a member of the staff of Telephone Services, Inc., operating service center for the Gary Group operating companies, retaining that position until his recent apointment.

Other changes announced by Mr. Schweitzer are: W. A. Dickinson, formerly general commercial manager of the Tri-County company, goes to Telephone Services Inc. at Chicago; succeeding Mr. Dickinson, C. O. Ingebrand, formerly commercial representative of the Union and Tri-County companies, has been appointed commercial superintendent; A. C. Purpura, former plant superintendent of the Tri-County company, is now district manager of the South Haven district; and W. J. Melchers, Jr. has been appointed plant superintendent of both companies.

◆

Don Walker Purchases Clifton, N. Y., Independent

Don W. Walker recently purchased a controlling interest in the Red Jacket Telephone Company, Clifton Springs, New York from Mrs. Daisy Osgood of Shortsville, New York, widow of the late Charles P. Osgood who founded the company.

Mr. Walker is far from a novice in telephone management. He began his career in 1930 with the Western Light & Telephone Company, Salina, Kansas, holding various positions with

(*Please turn to page* 84)

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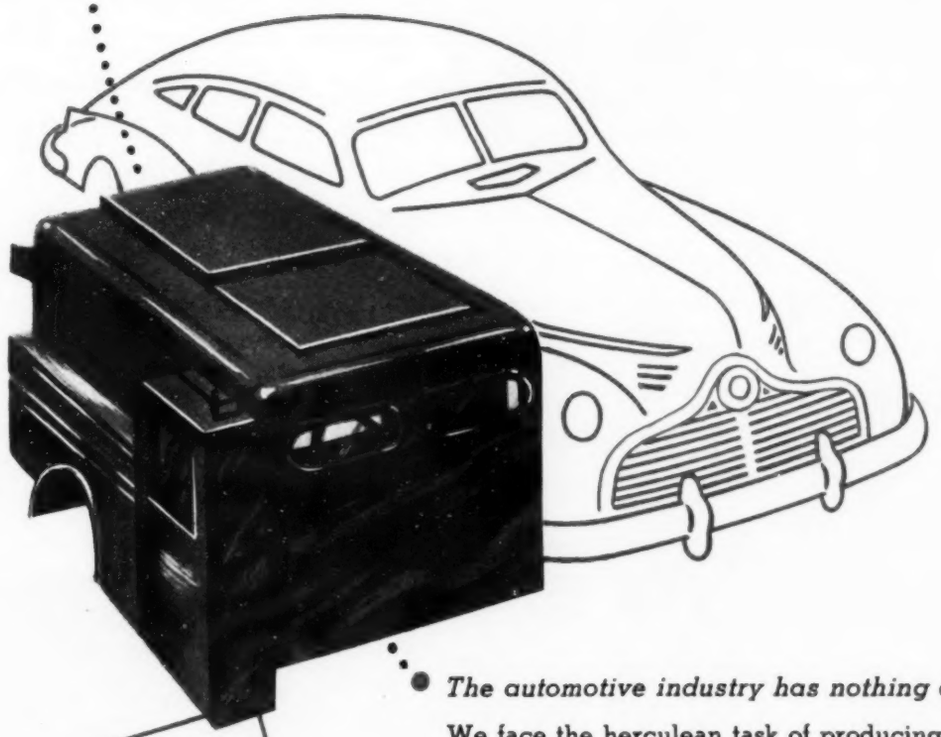

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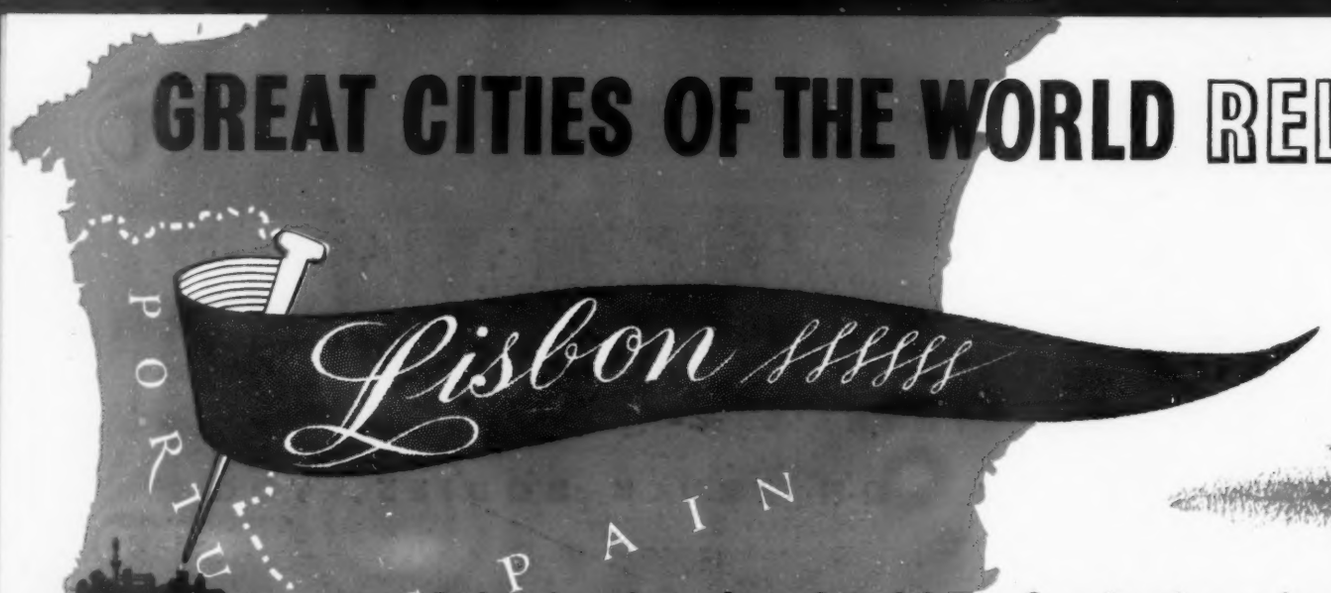
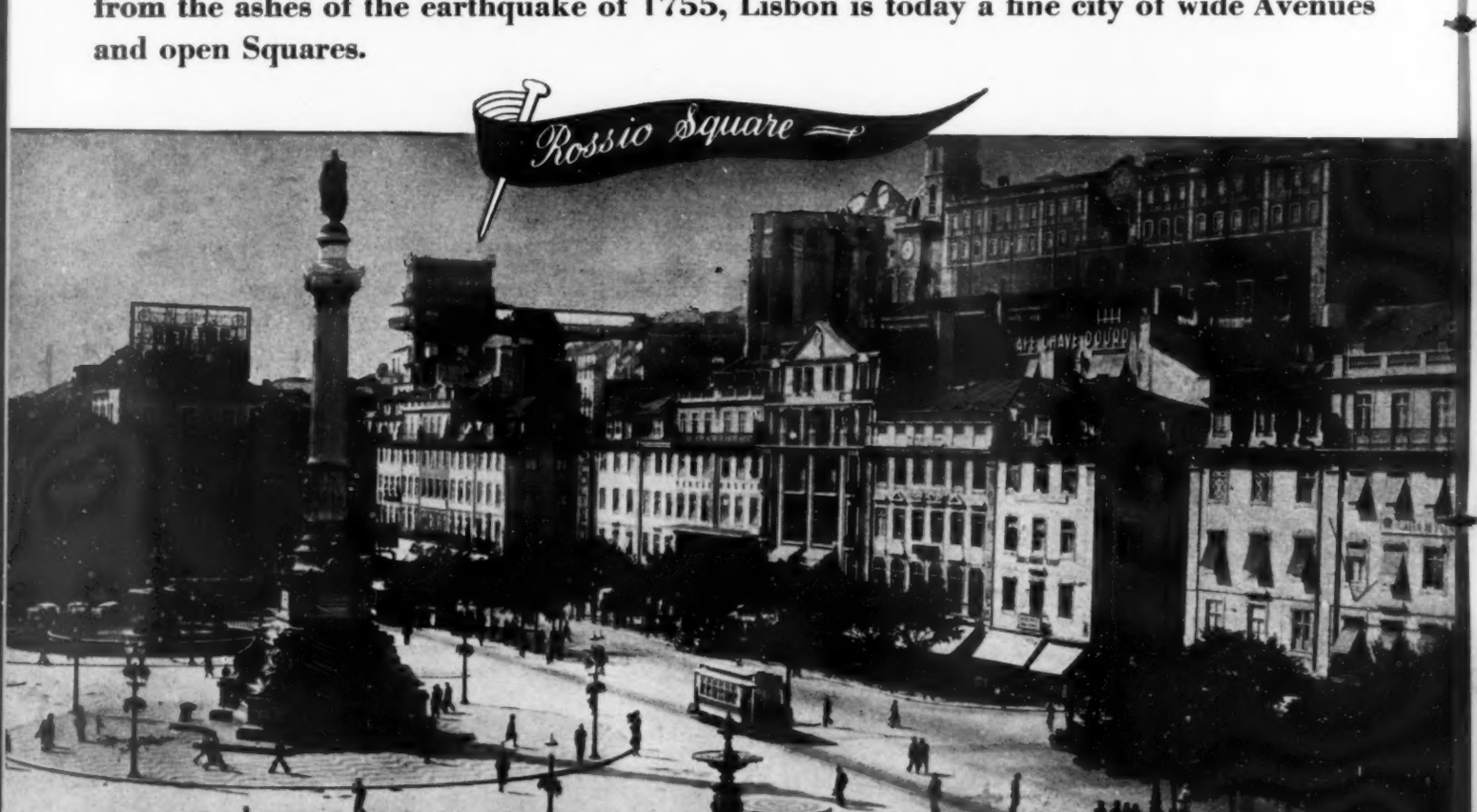


Lisbon

Lisbon has always been famed for its fine situation as its earlier names prove, one of them, for example, meaning "the friendly bay." Romantic stories describe its origin; one says that Lisbon was founded by Ulysses whilst another tells of two ravens who guided there the ship of Saint Vincent, the Patron Saint of Lisbon, whose tomb stands in the Cathedral. From the wide waters of the Tagus, "in which all the navies of the world might anchor" Vasco da Gama set sail on his voyage of discovery to India round the Cape of Good Hope, a fact commemorated by the erection of the beautiful Convent of Jeronymos, now one of the architectural gems of the world. In the Tagus, too, gathered that mighty invasion fleet which soon after belied its title of the "Invincible Armada." Risen phoenix-like from the ashes of the earthquake of 1755, Lisbon is today a fine city of wide Avenues and open Squares.



N STROWGER TELECOMMUNICATIONS

Photo : Final Selector Rack. Lisbon Exchange

The placing into service of the Norte Automatic Telephone Exchange in 1934 marked the completion of an advanced stage in the conversion to full automatic working of Lisbon's extensive Telephone network. Norte had an initial capacity of 8,800 lines and served the mainly residential area of the network owned and operated by the Anglo Portuguese Telephone Company; it has since been extended and 13,200 lines are now either in service or in process of installation, both subscriber and coin-box lines being provided.

The Strowger equipment supplied consists of single two-step line and cut-off relays and 200-point line finders operating on the partial secondary trunking system.

Estrella Exchange, employing Strowger type 32A (B.P.O. 2,000) selectors, was subsequently installed with 7,400 lines now operating or under installation, and has been followed by Trindade Second Unit with 3,400 lines and Campo Pequeno with 5,500 lines.

Strowger engineers have now in hand preparations for the supply of 1,800 lines for Belem Exchange. Progress will not cease there, for Lisbon is fully aware of the merits of Strowger Automatic Telephony and has long practical experience of its benefits.

★

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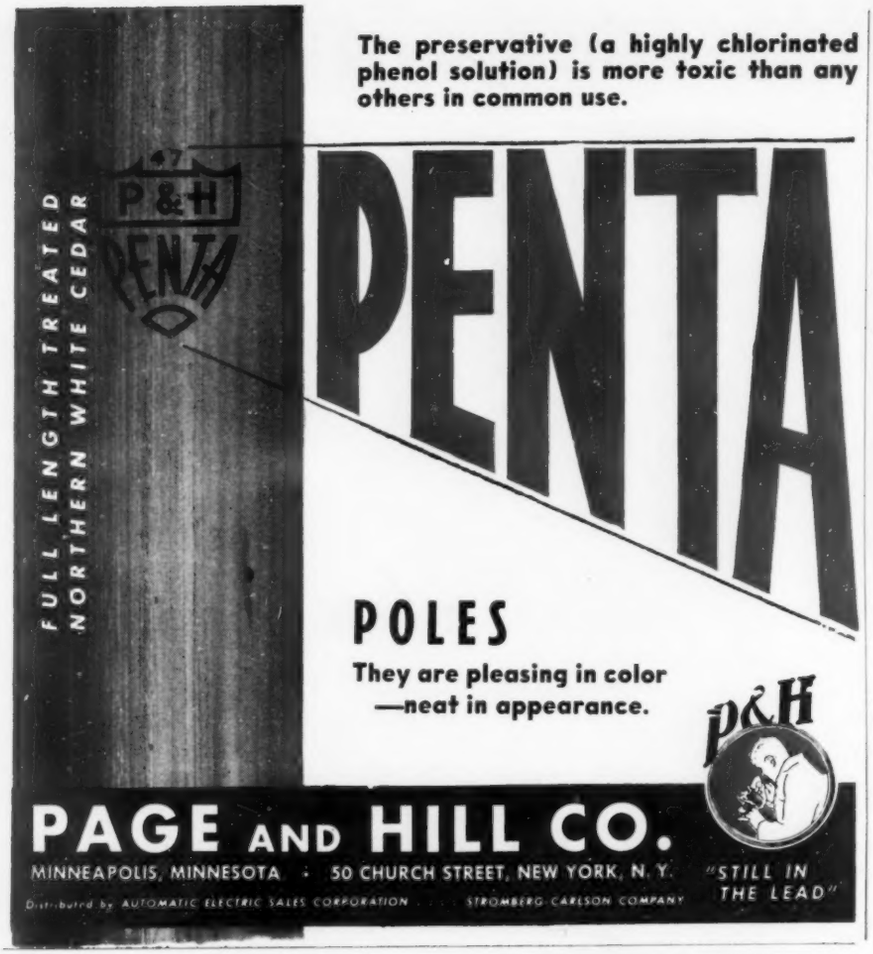
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DON W. WALKER

that company until 1938, when he became assistant secretary and general auditor of the Blue Mountain Telephone & Telegraph Company, Southern Telephone & Telegraph Company, and Wisconsin Telephone & Telegraph Company with headquarters in Bangor, Pa.

In 1941, Mr. Walker went to Fort Wayne, Ind., as commercial representative of Telephone Services, Inc., and in November of that same year, became secretary and general auditor of the Commercial Telephone Company subsidiaries with headquaretrs in Clinton, Ill., a position he held until his appointment as executive vice-president of the New York Telephone Association.

On March 1, 1947, Mr. Walker resigned as executive vice-president of the New York Telephone Association and became an executive of the Ontario Telephone Company, Inc. and Trumansburg Home Telephone Company, as well as director and sales manager for the Commercial Cord Company, Clifton, New York.

◆

Carolina T & T Purchases Rock Ridge Telephone Co.

The Carolina Telephone & Telegraph Company has been granted authority to purchase and acquire in whole the operating rights of the Rock Ridge Telephone Company for a consideration of $5.00 for each magneto telephone instrument recovered from present installations of the Rock Ridge Telephone Company.

The required rights of way for the proposed rural lines service to be furnished from the Wilson exchange of the Carolina company have been procured by present users of the Rock Ridge service and prospective users for the new service.

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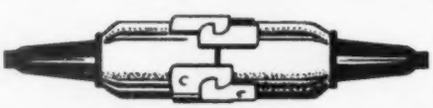

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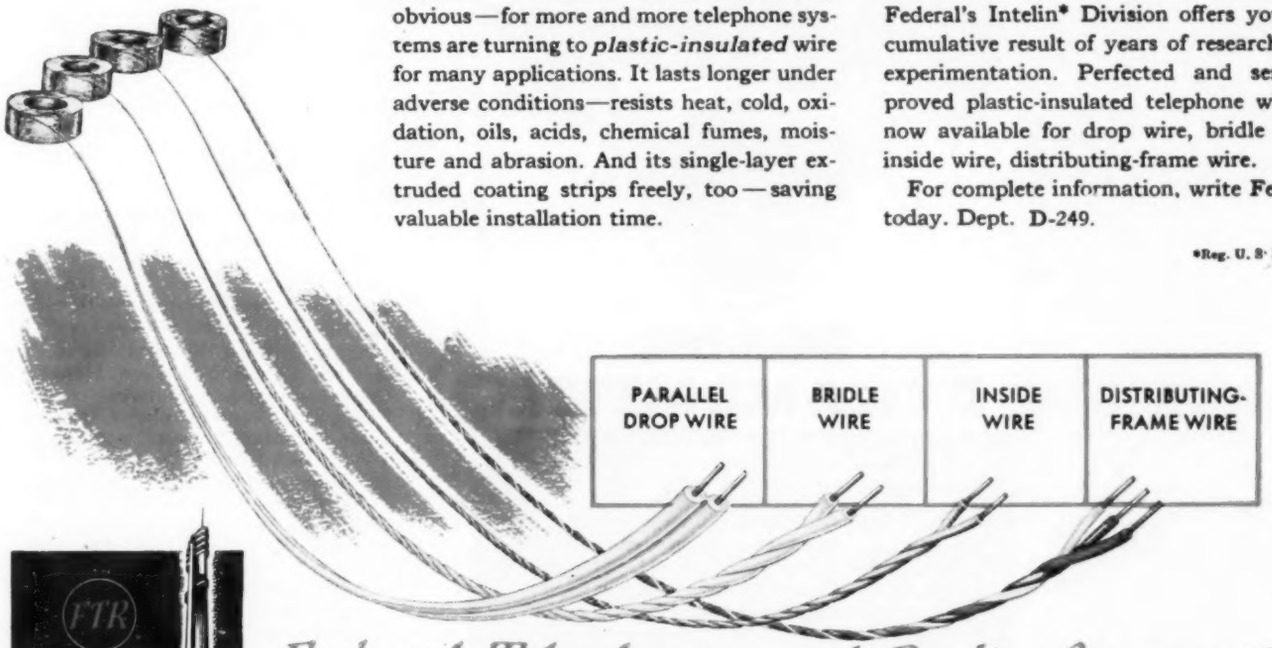

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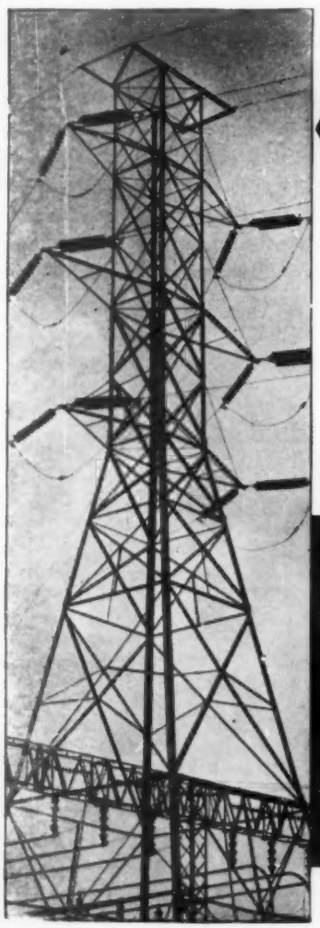

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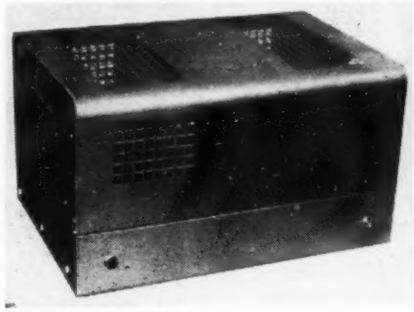

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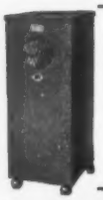

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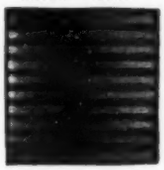

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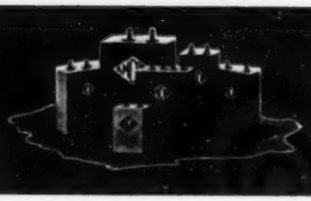

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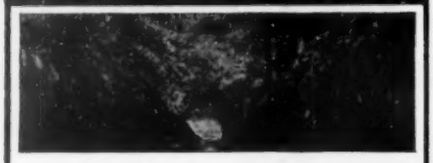
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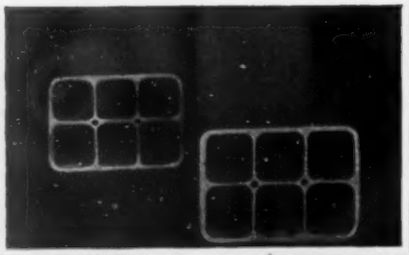
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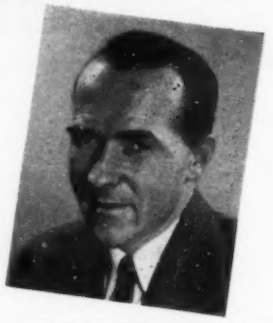

By JOHN G. REYNOLDS
Managing Editor

ARE PROFITS HIGH! . . .

LABOR LEADERS and left-wing commentators who have watched wages and commodity prices soar, express surprise that corporations, too, are making more money. They ignore the fact that a dollar won't buy any more for a corporation than it will for a mechanic.

It is true that corporate profits are up. It is estimated that they will reach $19,000,000,000 this year. Yet 1947 personal income of individuals —$199,000,000,000 based on September figures—is nearly 1,000 per cent higher than those "enormous" profits.

A comparison with former years shows whether corporate profits for 1947 merit the derogatory adjectives attached to them. In 1929, according to Commerce Department statistics, corporate profits of $8,300,000,000 represented 10 per cent of personal income. In 1941, they were $9,100,000,000, again 10 per cent of personal income.

When costs double, an individual needs twice as much money. Like individuals faced with rising prices, corporations must earn more dollars because each dollar is worth less.

• • •

'YOUTH VERSUS AGE' . . .

"A MAN IS AS old as he feels—and acts," is the opinion of most employers. In a survey entitled "Youth Versus Age," conducted by the National Industrial Conference Board, 90 per cent of the companies queried said they had no definite policy with regard to maximum hiring age.

After all, working ability varies widely with the individual and the type of work. Terrible Terry McGovern, the boxer, was a burned-out hasbeen at 21. George Bernard Shaw, the playwright, is still producing at 91.

The NICB co-operators conceded that on certain types of job the older workers tended to lack the physical endurance to outproduce their juniors quantitatively. As a result alert executives customarily shift a veteran employe to a more suitable job when he starts to slow down.

The cardinal fact that age is only a relative matter after all is illustrated by one of the better known stories about Oliver Wendell Holmes. One day the noted jurist, then in his 90s, was strolling along a Washington avenue with one of his Supreme Court colleagues. A strikingly good-looking girl passed by. Mr. Holmes sighed. "Oh to be 70 again!" he said.

• • •

LONG ARM OF THE LAW . . .

CRIME DOESN'T pay in Pennsylvania. In the Keystone State, the long arm of the law can now reach out faster and farther than ever before —by radiotelephone.

The most modern system of communication for state police in the country is rapidly being completed by the Bell Telephone Company of Pennsylvania. It is one of two state wide police radiotelephone systems being installed by the Bell System; the other, in New York state, is expected to be in operation this summer.

The Pennsylvania project will include 73 fixed radio transmitter-receiver stations. More than 250 police cars will be equipped.

• • •

LITTLE THINGS COUNT . . .

HOW often have you heard a woman say, *"It's the little things that count"*? It may be only holding the door open for the wife, sending her a flower on an anniversary, or just being polite in the morning instead of acting like a bear until you've had your morning coffee.

It's the little things that count in safety too. Picking up a broken bottle and putting it in a trash can, knocking down a nail protruding from a board on a platform, or just calling out a polite warning to some absent-minded fellow about to walk in front of a truck. *Big things are only accumulations of the little things.* A happy home and a safe job often depend on the little things that count.

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